NOV. 1914

MOTOR BOATING

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How Racing Speeds Have Jumped

Where Will It Stop?

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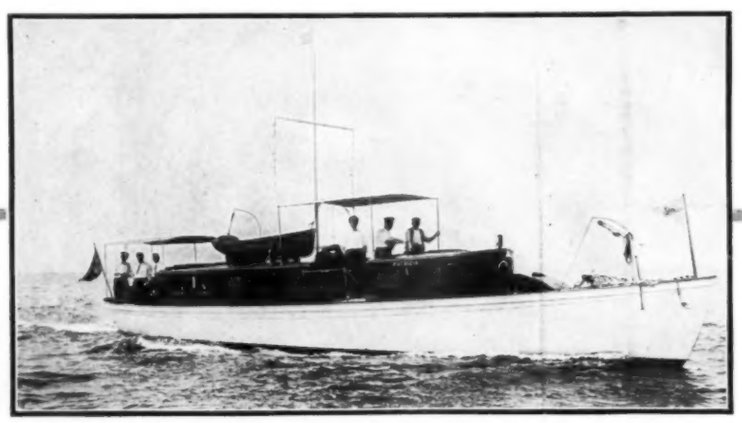

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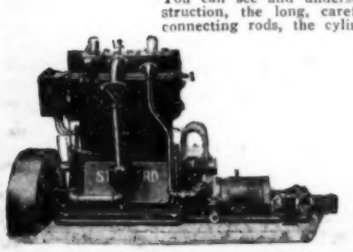

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All The Time, rounding the outer buoy at the races of the Ocean City Yacht Club.

NOVEMBER, 1914.

November, 1914 — MOTOR BOATING — Vol. XIV, No. 5

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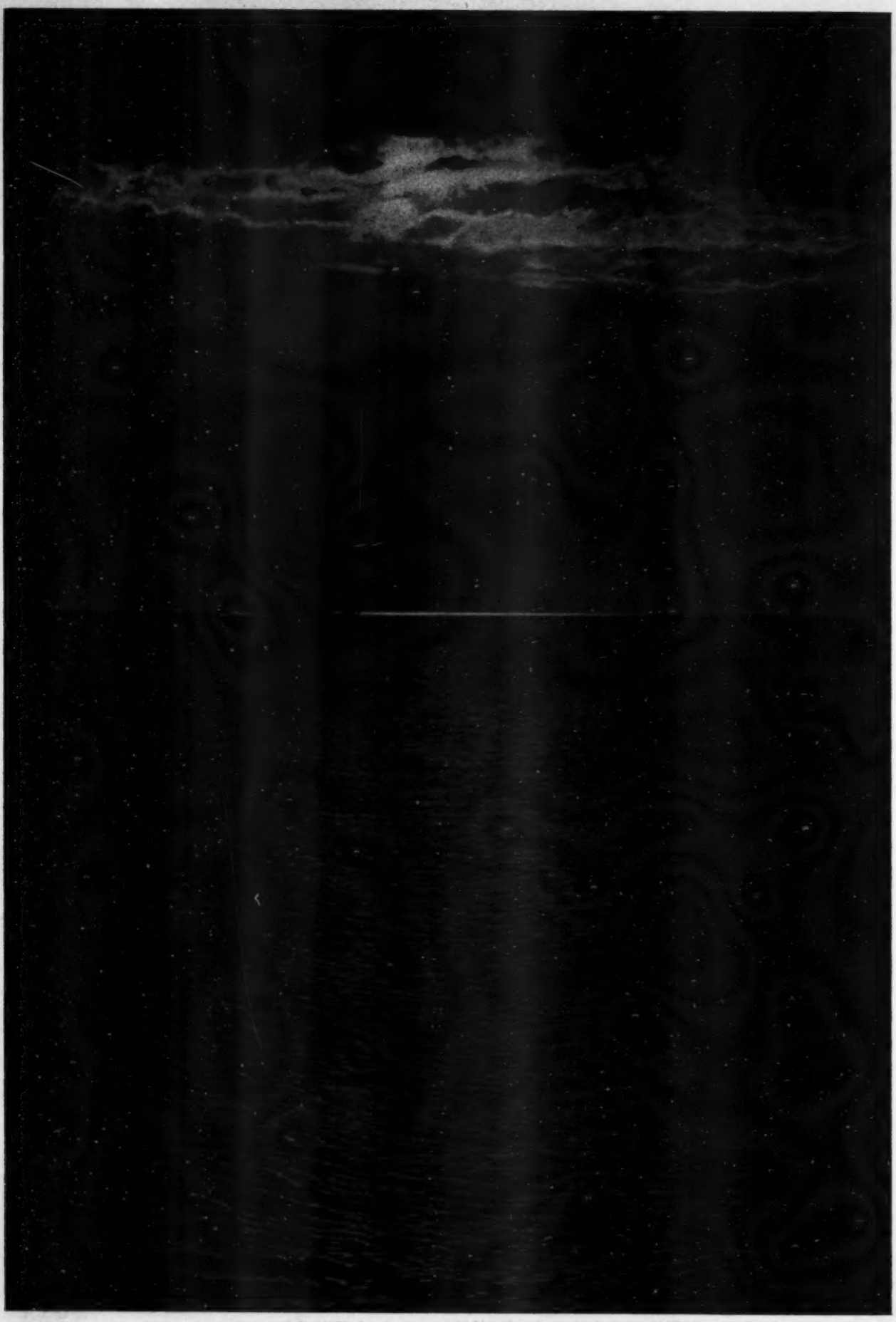
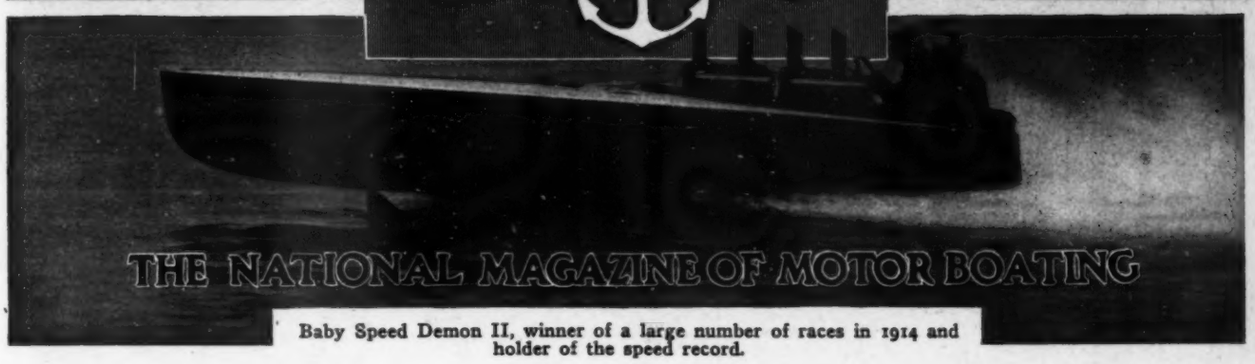


A Paradisaic moment when the motor boatman, scurrying across the quiet waters, sees a sail against a sun-bright horizon, and glimpses again the mystery and the beauty of the sea of old romance.

MOTOR BOATING

THE NATIONAL MAGAZINE OF MOTOR BOATING



Baby Speed Demon II, winner of a large number of races in 1914 and holder of the speed record.

How Racing Speeds Have Jumped.

The Remarkable Progress Made in the Speed Development of the Modern Racing Hydroplane. An Increase in Speed of Forty-three Per Cent. Accomplished With a Diminution in Power.

THIRTY-FIVE miles an hour! Such a statement that a certain speed boat had made this speed in a certain race this year hardly warrants even passing notice—at any rate, it is hardly worth much importance today as a remarkable performance, yet only four seasons ago, in 1910, this was the exact figure which Dixie III was able to maintain on the Niagara river at Buffalo, and she had thus broken the best American motor boat records ever made, if not all world's records for any distance. Previously during the year 1910, this boat had averaged 34.8 miles per hour in the race which gave her title to the British International Trophy and 33.2 miles an hour in the Gold Cup races, all of which were records at the time they were made.

On the Buffalo course this year three boats with some 30 to 40 horsepower less than was required to drive Dixie III along at this phenomenal speed of 35 miles an hour, were able to travel more than 10 miles an hour faster than she did and one of the three did an even 15 miles better as an average speed over a complete 35-mile course.

In cold figures, this gain in racing speed amounts to 43% in four years or more than 10% per year. If computed for an equal time into the future we find that this amounts to 72 miles an hour in 1918. Impossible, many will say, but wait a moment. Let us analyze how the speeds have been jumped in *any* of the important events for the last few years and we will find that those at Buffalo are typical of the majority of cases. Or better still, take the average of them all from year to year and see what these figures show.

For example, the average in 1910 for the eight most important races of the year was 31.5 miles an hour; in 1911, this went up to 34.1 miles per hour as an average, an increase of 8.3%. In the interval from 1911 to 1912 the gain was 11.7%, the next year 15.2% and from 1913 to the present season just closed, 4.6%. This last figure can hardly be taken as representative, as a number of existing circumstances tended to bring the average down this year, apparently to a much lower figure than it should be. Two of the classic events which call for the very highest type of boat were not held, largely on account of foreign conditions. The British International races naturally had to be postponed even after the final preparations had been made and none of the boats built for this series competed in other events, so the speed averages for 1914 necessarily suffered on this account. The Chicago races which generally decide the Western championship were also called off and for the past few years remarkably fast speeds have been in order at these Lake Michigan races.

On the Pacific his year, there were two very fast new boats, Oregon Kid and the new Oregon Wolf, both of which are capable of speeds around fifty miles an hour, but when they came together in the annual championship races of the Pacific coast, the weather was so bad and stayed so bad for the three days on which racing was attempted, that the official speeds fell off to 35 miles an hour.

The average for 1914 could be conservatively placed at forty-nine or perhaps fifty miles an hour, as in the big races, where the conditions were as they should be for hydroplane racing, the winning boats consistently averaged in the neighborhood of fifty miles an hour. In the greatest of all races this year—those for the Gold Challenge Cup on Lake George, in two of the three thirty nautical mile races, the winner's speed averaged in excess of fifty miles an hour. Then if we take the average speed for this year at 49 we find that this is an increase of 11.6% of the average of 1913.

This great increase in speed during the past few years has not been accomplished by adding more and more power. Quite the reverse, for the total power in a large number of cases has remained constant and development in the type of hull has largely been responsible for the added speed. To be sure, the engine manufacturers have kept pace with the development in hulls and for a given piston displacement in their motors are getting more power than ever before out of their engines. The increase in revolutions per minute also have been of material benefit in this respect.

Average Speeds Made by Winning Boats During Last Five Years in Eight Classic Events.

	1910	1911	1912	1913	1914	Avg.
Buffalo Regatta	35.0	39.7	46.3	43.2	50.0	42.8
B. I. T. Races.....	34.8	40.5	43.3	49.2	R.N.H.	41.9
Gold Cup Races.....	33.2	31.5	36.8	44.5	50.5	39.3
Pacific Coast		32.9	38.9	43.0	35.0*	38.1
Western Championship.	29.4	35.6	40.3	41.9	R.N.H.	36.8
Miss. Valley P. B. A...	27.5	32.0	35.8	45.6	41.3	36.4
National Carnival	30.0	28.5	38.9	38.3	28.5*	33.9
Gr't Lakes Champsh'p.	30.8	32.0	25.3	45.1	31.3 (1)	32.9
Average	31.5	34.1	38.2	43.9	46.0 (2)	...

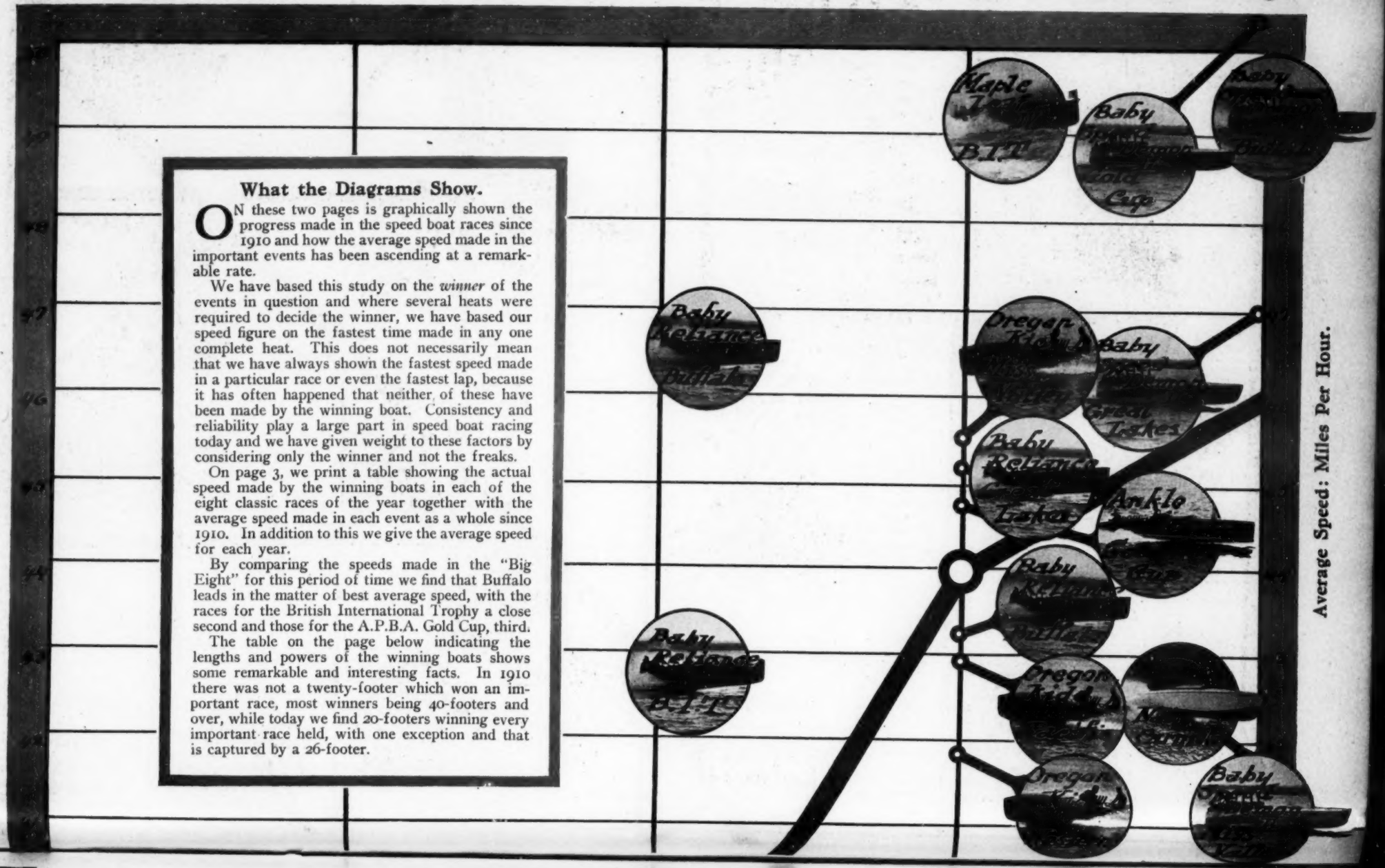
* Slow speed due to unfavorable conditions, not included in averages.

(1) Speed made at Toronto by Buffalo Enquirer; at Buffalo Regatta this boat averaged 45.4 m.p.h.

(2) Average adjusted giving some importance to figures marked (*).

(*Further specifications of these winning boats and their power plants will be found in the table on page 5.*)

MoToR BoatinG's Annual Review of Motor Boat Racing.



What the Diagrams Show.

ON these two pages is graphically shown the progress made in the speed boat races since 1910 and how the average speed made in the important events has been ascending at a remarkable rate.

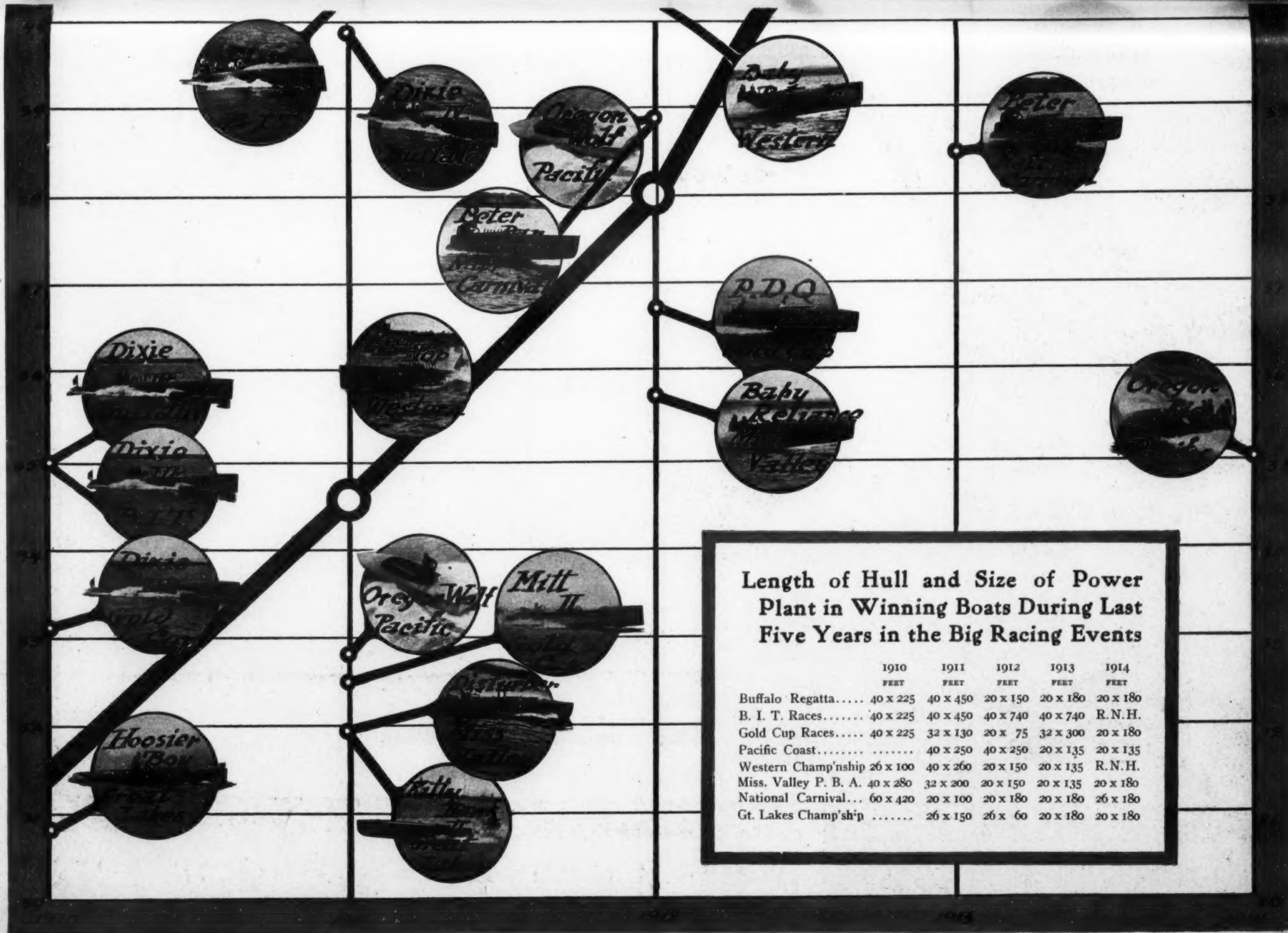
We have based this study on the *winner* of the events in question and where several heats were required to decide the winner, we have based our speed figure on the fastest time made in any one complete heat. This does not necessarily mean that we have always shown the fastest speed made in a particular race or even the fastest lap, because it has often happened that neither of these have been made by the winning boat. Consistency and reliability play a large part in speed boat racing today and we have given weight to these factors by considering only the winner and not the freaks.

On page 3, we print a table showing the actual speed made by the winning boats in each of the eight classic races of the year together with the average speed made in each event as a whole since 1910. In addition to this we give the average speed for each year.

By comparing the speeds made in the "Big Eight" for this period of time we find that Buffalo leads in the matter of best average speed, with the races for the British International Trophy a close second and those for the A.P.B.A. Gold Cup, third.

The table on the page below indicating the lengths and powers of the winning boats shows some remarkable and interesting facts. In 1910 there was not a twenty-footer which won an important race, most winners being 40-footers and over, while today we find 20-footers winning every important race held, with one exception and that is captured by a 26-footer.

Average Speed: Miles Per Hour.



Length of Hull and Size of Power Plant in Winning Boats During Last Five Years in the Big Racing Events

	1910 FEET	1911 FEET	1912 FEET	1913 FEET	1914 FEET
Buffalo Regatta.....	40 x 225	40 x 450	20 x 150	20 x 180	20 x 180
B. I. T. Races.......	40 x 225	40 x 450	40 x 740	40 x 740	R.N.H.
Gold Cup Races.....	40 x 225	32 x 130	20 x 75	32 x 300	20 x 180
Pacific Coast........	....	40 x 250	40 x 250	20 x 135	20 x 135
Western Champ'nship	26 x 100	40 x 260	20 x 150	20 x 135	R.N.H.
Miss. Valley P. B. A.	40 x 280	32 x 200	20 x 150	20 x 135	20 x 180
National Carnival...	60 x 420	20 x 100	20 x 180	20 x 180	26 x 180
Gt. Lakes Champ'sh'p	....	26 x 150	26 x 60	20 x 180	20 x 180

Average Speed: Miles Per Hour.

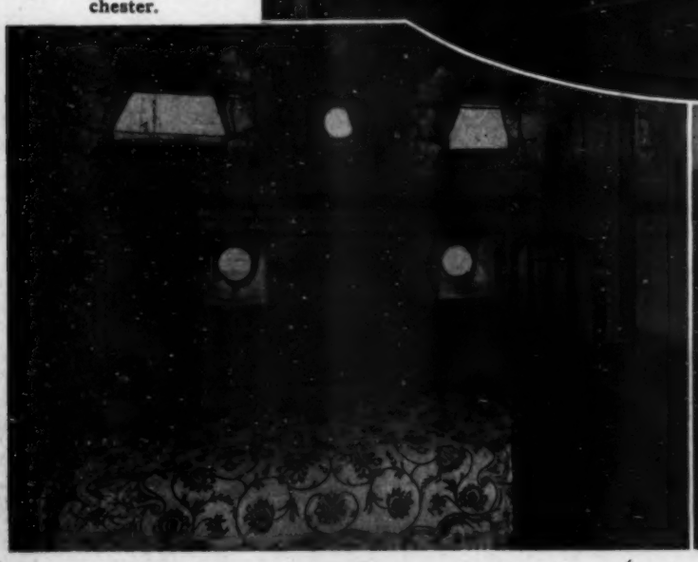
Stateroom Luxury

Aboard Blue Bird, C. L. Poole's 126-footer.

THAT the yachtsman who desires the comforts and luxuries of home, which have heretofore been found only aboard the largest and most costly steam yachts, is no longer required to resort to that kind of steam craft is plainly evident from the illustrations on these two pages.

Even on craft as small as 68-footers similar stateroom ac-

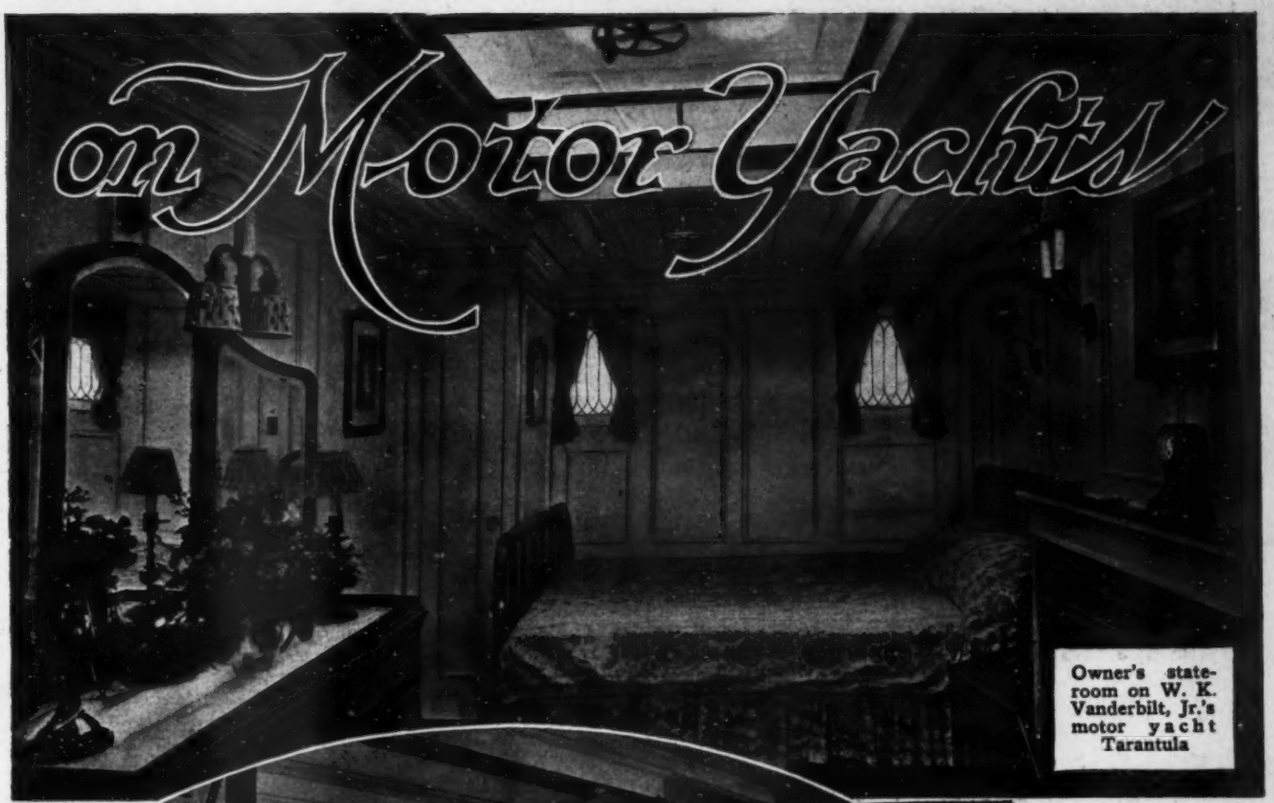
On P. W. Rouss' high-speed yacht, Winchester.



Below decks on the 83-footer, Drusilla.

One of the rooms on Allegro.

on Motor Yachts



Owner's stateroom on W. K. Vanderbilt, Jr.'s motor yacht Tarantula

commodation is possible for those that desire it and on the 110-foot motor yacht of today the owner can feel sure that not only his own private stateroom is finished up in a style equal to any room ashore, but also that his guests are taken care of in luxurious fashion.

A forty-footer has possibilities too, as will be seen from one of the illustrations on this page.

Two of the connecting staterooms on the 68-footer, Nahmeoka.

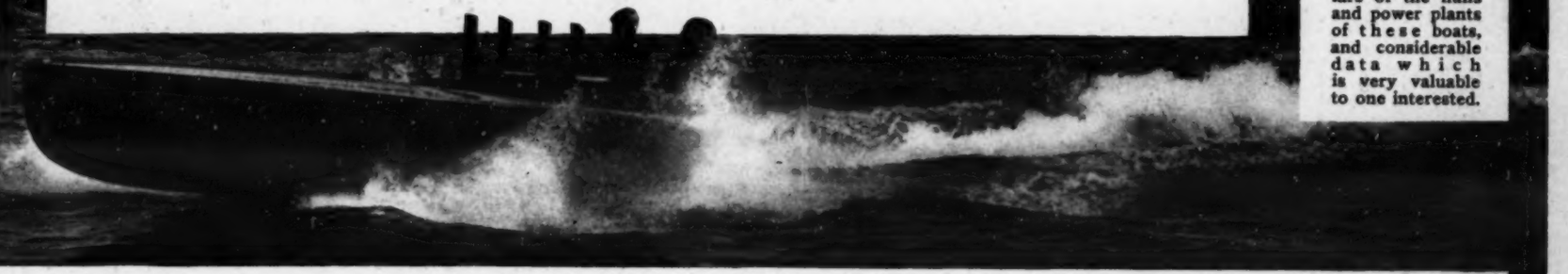
On the 40-footer, Margo II.

The owner's stateroom on Florence, the largest motor yacht afloat.

THE table below shows the results of many of the most important racing events held this year and compares the speed made in these races with that recorded in the same races for the last three years.

The Championship Races of 1914.

The Winning Boats. Their Engine and Hull Specifications.



BESIDES the names, owners and speed made by the winning boats, the table below gives the full particulars of the hulls and power plants of these boats, and considerable data which is very valuable to one interested.

The Speed Boat Events and Their Winners.

Event	Where Held In 1914	Length of Race, Miles	Names of Boats	Owner	Elapsed Time	Length of Boat	Type of Hull	Make of Motor	H.P.	No. of Cyl.	Bore and Stroke	Winner's Speed, Statute Miles per Hour 1914	1913	1912	1911
Mississippi Valley—Class B	Peoria, Ill.	10	P. D. Q. IV	A. C. Strong	21-15*	14+	Hydro	Johnson	60	4	5 x4	28.2	24.1	26.2	27.5
Mississippi Valley—Class C	Peoria, Ill.	15	Warren-Groat	W. T. Warren	27-39*	20	Hydro	Wisconsin	90	4	5.1x5½	32.5	28.1	34.3	28.8
Mississippi Valley—Class D	Peoria, Ill.	15	Warren-Groat	W. T. Warren	29-37	20	Hydro	Wisconsin	90	4	5.1x5½	30.4	27.0	35.8	27.0
Mississippi Valley—Class E	Peoria, Ill.	20	Spot	T. J. Tracy	32-26	20	Hydro	Van Blerck	180	8	5½x6	37.0	44.7	34.8	32.0
Western Power Boat Association	.....	Races scheduled for 1914 were called off		.....	.....	.....	.....	.....	.....	.....	.....	.....	41.1	40.3+	35.6
Wrigley Championship	.....	Races scheduled for 1914 were called off		.....	.....	.....	.....	.....	.....	.....	.....	.....	42.0	38.5+	†
Gold Challenge Cup	Lake George, N. Y.	30c	Baby Speed Demon II	Mrs. J. S. Blackton	41-03*	20	Single Step	Sterling	180	8	5½x6¼	50.49	44.5	36.8	32.6
Great Lakes Championship	Toronto, Ont.	35	Buffalo Enquirer	W. J. Conners	67-08	20	Single Step	Sterling	180	8	5½x6¼	31.3	43.6	25.3	33.0
National Carnival—Class A (Handicap)	Manhasset Bay, N. Y.	30c	Muirmaid	P. A. Proal	1-17-19*	20	Hydro	Fiat	80	4	5½x5½	27.2	22.4	24.8	25.3
National Carnival—Class B (Handicap)	Manhasset Bay, N. Y.	No starters in this class in 1914		.....	.....	.....	.....	.....	.....	.....	.....	.....	18.5	28.2	24.5
National Carnival—Class C	Manhasset Bay, N. Y.	30c	Harpoon	W. H. Young	1-12-42	26	Hydro	Van Blerck	180	8	5½x6	28.5(1)	38.3	38.9	28.5
British International Trophy Races	.....	Races scheduled for 1914 were called off		.....	.....	.....	.....	.....	.....	.....	.....	.....	49.2	42.6	40.5
Pacific—Free-for-All	Astoria	30	Oregon Kid II	M. Smith	74-19	20	Hydro	Van Blerck	135	6	5½x6	24.2(1)	38.4	38.9	32.9
Pacific—20' Class	Astoria	6	Oregon Kid II	M. Smith	10-15	20	Hydro	Van Blerck	135	6	5½x6	35.0(1)	43.0	32.3	†
Buffalo—First Day	Niagara River	25	Baby Reliance V	J. S. Blackton	33-02	20	Single Step	Sterling	180	8	5½x6¼	45.4	40.4	45.5	32.1
Buffalo—Second Day	Niagara River	30	Baby Speed Demon II	Mrs. J. S. Blackton	36-27	20	Single Step	Sterling	180	8	5½x6¼	47.0	43.2	41.0	39.7
Buffalo—Third Day	Niagara River	35	Baby Speed Demon II	Mrs. J. S. Blackton	41-48	20	Single Step	Sterling	180	8	5½x6¼	50.2	42.0	46.3	33.8
Mississippi Valley—Statute Mile Dash	Peoria, Ill.	1	Baby Speed Demon II	C. C. Smith	1-06	20	Single Step	Sterling	180	8	5½x6¼	54.54	48.0	53.7	38.7

c Indicates nautical miles.
* Indicates fastest time in heat races.
1 Indicates slow speed due to unfavorable weather conditions.

Non-Stop Cruiser Handicap Events of Over 100 Miles in Length.

	WINNERS OF CORRECTED TIME PRIZE								WINNERS OF FAST TIME PRIZE					
Events	Length of Races, Miles	Name of Boat	Owner	Elapsed Time	Waterline Length and Beam	Make of Motor	No. of Cyls.	Bore and Stroke	Name of Boat	Owner	Make of Motor	Best Time 1914	Best Time 1913	Best Time 1912
Philadelphia-Bermuda	734c	Race not held in 1914	.....	.....	.....	.....	....	.....	.....	.....	.....	.....	85-55-20	104-29-05
Camden-Baltimore Class A	368½c	Caliph	M. E. Brigham	41-11-25	58.13x11.85	Kent	4	6 x8	Marguerite II	A. B. Cartledge	Keystone	37-55-00	†	†
Camden-Baltimore Class B	368½c	Flyaway III	T. B. Taylor	23-50-00	37.27x 7.8	Van Blerck	6	5½x6	Flyaway III	T. B. Taylor	Van Blerck	23-50-00	†	†
N. Y.-Albany and Return (A. P. B. A.)	270	Retta D.	Chas. Dalton	34-58-33	27.88x 7.55	Ralaco	2	4 x6	Thistle	J. H. Wallace	Sterling	23-42-22	23-55-31	27-35-25
N. Y.-Albany and Return (Viking)	270	Fabius	W. E. Thomas	23-41-50	30.92x 7.13	Lamb	4	4½x6¼	No time prize offered	.....	.....	23-41-50	23-55-31	27-35-25
N. Y.-Cornfield and Return	183c	Flyaway III	T. B. Taylor	13-00-10	27.88x 7.55	Van Blerck	6	5½x6	Flyaway III	T. D. Taylor	Van Blerck	13-00-10	21-47-11	20-40-50
Pacific International	115c	Corsair	B. F. Jacobs	13-09-30	49.73x11.08	Buffalo	4	6 x7½	Corsair	B. F. Jacobs	Buffalo	13-09-30	11-20-00	2
N. Y.-Block Island (A. P. B. A.)	115	Alfred S.	H. Soeldner	13-51-30	24.17x 7.67	Metropolitan	1	5 x5½	Thistle	J. H. Wallace	Sterling	10-10-00	10-30-00	10-45-00
N. Y.-Block Island (Viking)	115	Thistle	J. H. Wallace	10-10-00	37.0 x 7.15	Sterling	4	5½x6	No time prize offered	.....	.....	10-10-00	11-21-41	10-45-00
Yachtsmen's Club	154c	Mirna	J. Snellenburg	19-56-00	38.73x 9.95	Hall	4	5½x6¼	Dream	C. L. Lagen	Standard	19-39-00	(*)	(*)
Delaware River Y. R. A.	178c	Mirna	J. Snellenburg	21-45-20	38.73x 9.95	Hall	4	5½x6¼	Marguerite II	A. B. Cartledge	Keystone	17-46-27	17-26-42	(*)

2 Indicates distance not the same as in 1914.
† Indicates race not held that year.
c Indicates nautical miles.

The Seasons Last Races on the Schuylkill

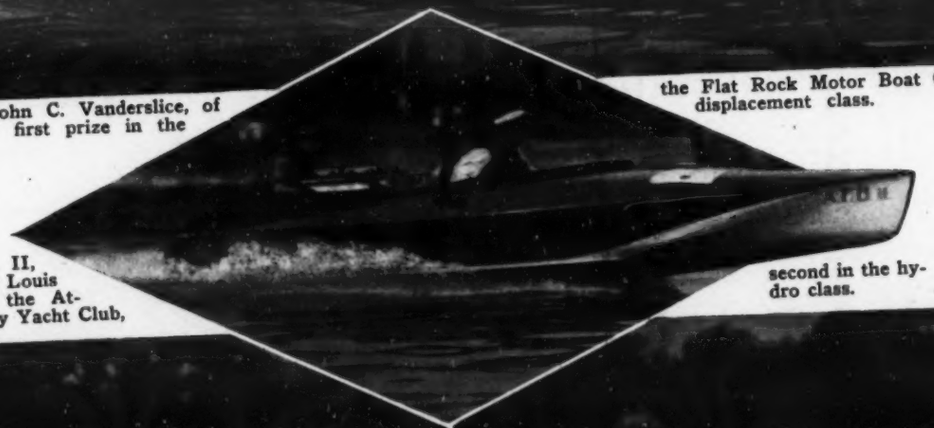
Xqqme, owned by John C. Vanderslice, of the Flat Rock Motor Boat Club, winner of first prize in the displacement class.

THE Norristown Motor Boat Club on the Schuylkill River upheld its reputation as being able to run off a successful race meet on Saturday, October 3rd, on the course off their Club House.

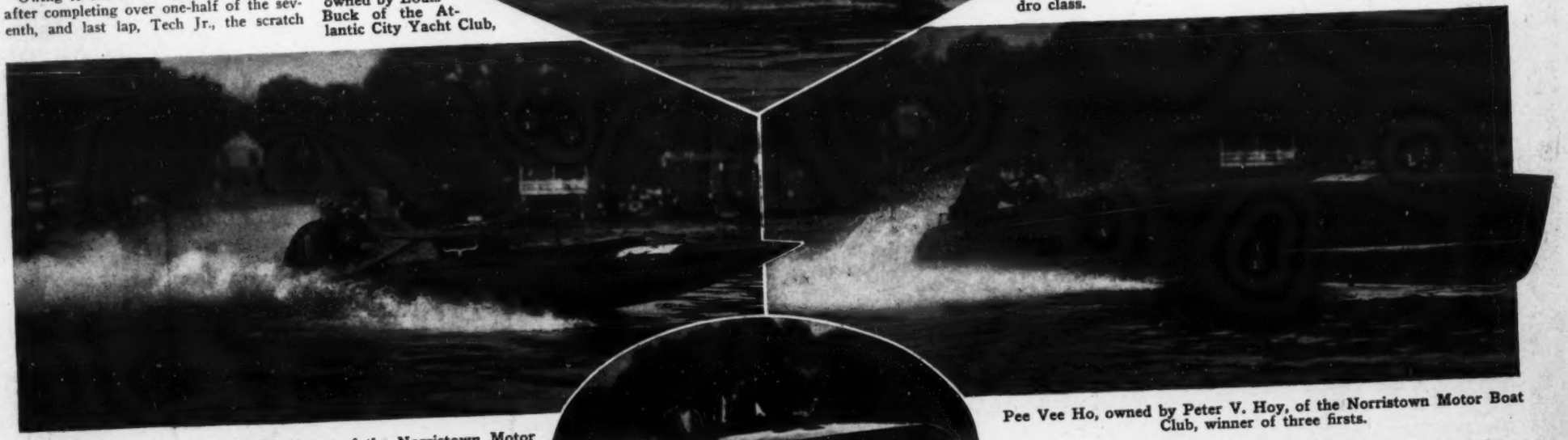
The races were twenty-five nautical miles in length over a course requiring seven laps to complete this distance. Hydroplanes and displacement boats were run together, but under separate classification, being designated by H and D, respectively.

Owing to the throwing off of her wheel after completing over one-half of the seventh, and last lap, Tech Jr., the scratch boat, which then led the field by 30 sec., lost the race to Pee Vee Ho, the latter having an allowance at 2.52. While Tech Jr. undoubtedly deserved the honors, the victory of Pee Vee Ho was a popular one, since she carries the Norristown colors. Misfortune has attended all her previous races this season, but she was destined to reserve her star performance for her own course at the close of the season. Her initial salt water experience was at the regatta of the Ocean City Y. C. on Aug. 29. Here with the race well in hand she snapped a rear shaft strut in turning a buoy, permitting the propeller to cut a hole in her bottom. She was beached before filling, hauled out later, and effected temporary repairs.

In the Norristown race, Pee Vee Ho made ample amends for her previous failures by combining three triumphs in one. She took first in the hydroplane class from a field of six; first for the best actual time over the course, irrespective of class, and a special prize for lowest average variation for the seven laps (consistency).



A. F. B. II, owned by Louis Buck of the Atlantic City Yacht Club, second in the hydro class.



Black Cat, owned by John H. Slater, of the Norristown Motor Boat Club.

Pee Vee Ho, owned by Peter V. Hoy, of the Norristown Motor Boat Club, winner of three firsts.

Tech Jr.

Methods of Finding Displacement.

Determining the Areas of the Sections Without a Planimeter by Simpson's Rules. A Few of the Simple Formulæ Which the Amateur May Easily Follow.

By L. C. Robertson.

MOST amateurs and a good many boat-builders do not understand how to figure the displacement of a boat.

There are quite a number of ways of doing this problem, of which a few will be described here.

The boat from which these calculations were taken was a forty-foot flush-deck cruiser (see Fig. 2), but the rules hold good even if the boat is an eight-foot dink, or an ocean greyhound.

Simpson's First Rule

This is one of the most used rules in finding displacement. Placed in words, this rule reads: Divide the waterline into a convenient odd number of points equidistance from each other. (These are called stations.) Then to the sum of the areas of the under-water sections, add four times the even and twice the odd, under-water sections. The sum thus obtained, multiplied by one-third the common distance apart of the stations will give the volume of the under-water body.

In putting this rule in use, for convenience sake, we will divide it into four columns: the first will be the number of the station or section; the second, the areas; third, the multipliers; and fourth, the products of the areas and multipliers, which are called the functions. (See Table I.)

To allow for the scale this sum must be multiplied by 16/9, which will make the total 161.28.

Therefore, the displacement in cubic feet will be 161.28x3.73/3 x2 equals 401.-0496 cu. ft., in which the 3.73/3 is the distance between the stations multiplied by ⅓, and the 2 is for the other side of the boat.

Salt water weighs 64 pounds, and fresh water weighs 62.5 pounds to the cubic foot.

Therefore, in salt water this boat would displace 401.0496 x 64 equals 25,667.1744 pounds, or 12.8 tons.

TABLE I

STATIONS	AREAS	SIMPSON'S MULTIPLIERS	FUNCTIONS
0	0.00	1	0.00
1	0.78	4	3.12
2	2.42	2	4.84
3	3.79	4	15.16
4	4.62	2	9.24
5	4.92	4	19.68
6	4.61	2	9.22
7	4.05	4	16.20
8	3.09	2	6.18
9	1.77	4	7.08
10	0.00	1	0.00
		Total	90.72

In fresh water the boat would displace 401.0496 x 62.5 equals 25,065.6 pounds, or 12.5 tons.

Simpson's Second Rule

Simpson's second rule is more accurate than his first, but for all ordinary purposes the first rule will suffice.

Simpson's second rule in words, reads: Divide the waterline into 4-7-10 and so on parts, equidistance from each other, called stations. Then to the sum of the areas of the end under water sections, add three times the second and third, twice the fourth, three times the fifth, sixth and etc. The sum thus obtained, multiplied by three-eighths the common distance apart of the stations, will give the volume of the under body.

The meaning of this rule is, if the waterline was divided into four points, the multipliers would be, 1-3-3-1, in seven points, 1-3-3-2-3-3-1, or, in ten points, 1-3-3-2-3-3-2-3-3-1. Then, to get the cubic feet in the under body, proceed as in the first rule, except in multiplying the common distance between the stations by one-third as in rule one; here it would be multiplied by three-eighths.

The general method of using the second rule is given in Table II.

TABLE II

STATIONS	AREAS	MULTIPLIERS	FUNCTIONS
0	0.00	3/8	0.00
1	2.42	1	2.42
2	4.62	1	4.62
3	4.61	1	4.61
4	3.09	1	3.09
5	0.00	3/8	0.00
		Total	14.74

The volume obtained by the second rule will be different from that obtained by the first, but the difference is never enough to do any harm. This rule is very handy when the waterline is divided into four parts, as then the first cannot be used.

If the waterline is divided into six parts, neither of these hold good, then the following is the rule needed.

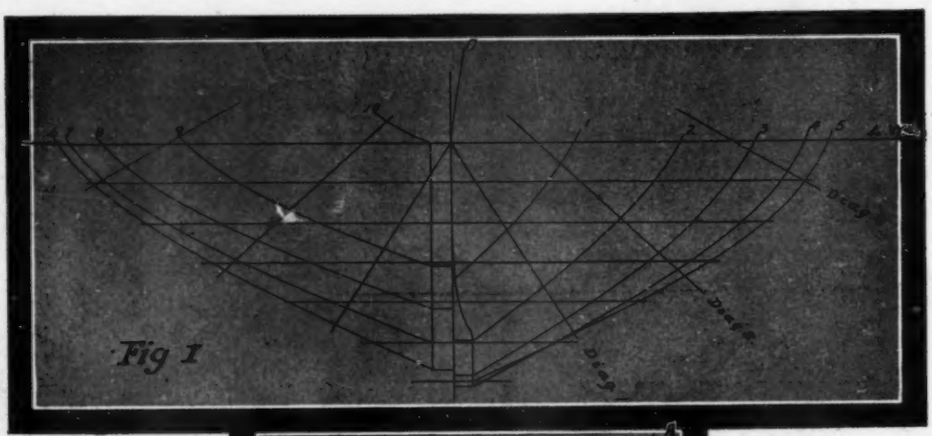
When the base-line or water-line is divided into six parts, to two-fifths the areas of the end stations, add the sum of the areas of the other stations, the sum thus obtained multiplied by 25/24ths, the common distance apart of the stations will give the volume of the body displaced. (See Table II.)

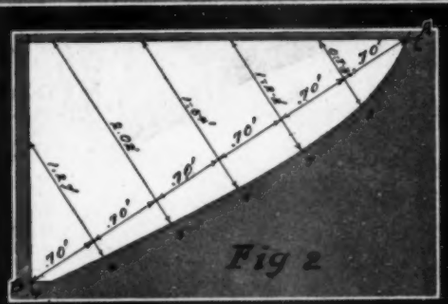
To allow for the scale, this sum must be multiplied as before by 16/9, which will make the total 26.204.

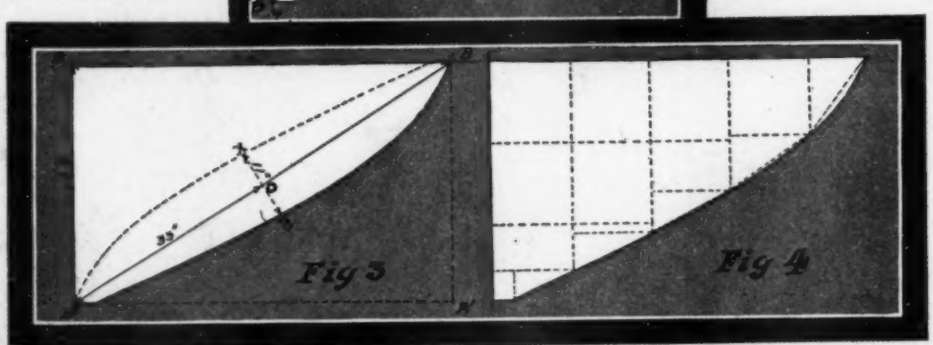
Therefore, the volume in cubic feet will be 26.204 x (25/24 x 7.46) x 2 equals 407.21016 cu. ft.

This would put the displacement at 26061.45 pounds, or 13.03 tons in salt water. Notice the difference in the result from that obtained by the first rule. This shows that the more stations used the more accurate it will be.

Another method is to use the areas of the waterplanes in place of the areas of the sections, and then proceeding as before described. This method is seldom used except as a check on the other three rules.







Body plan and some of the sections taken from the design of a 40-foot cruiser.

Finding the Areas of the Sections

(A) Without a Planimeter.

If the amateur does not possess one of these handy instruments, he can use one of the following methods in finding the areas of the under-water sections.

One of the most accurate methods of finding the area of a section without a planimeter is shown in Figure 2.

The line *AB* is drawn from the point of intersection of the waterline and station line, to the intersection of the keel-line and the

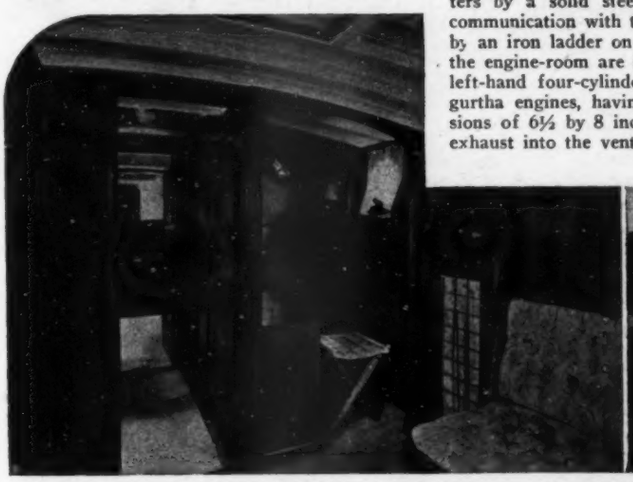
(*Continued on page* 48)

An 85 Footer With Twin Screws

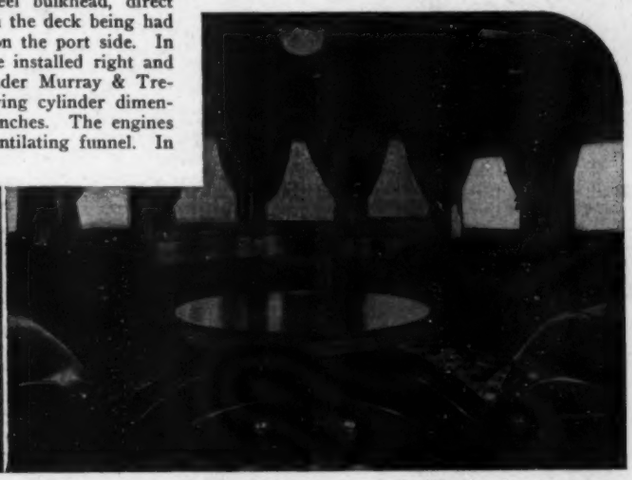
Paloma is a big fellow from Boston, flying the flag of the Eastern Y. C.

PALOMA is an 85-foot twin-screw vessel designed by Murray & Tregurtha and built this year by the designers at their yards in South Boston, Mass., for Mr. Dudley L. Pickman, of Beverly, Mass. Paloma measures 85 feet overall and 78 feet and 5 inches on the waterline by 14 feet beam and 5 feet draft. She is, generally speaking, of the raised deck type, and has a deck house forward, bridge amidships, trunk cabin aft, and a roomy flush after-deck, with boarding stairway on the starboard hand.

Below decks, Paloma is laid out with crew's quarters in the forecastle followed by the galley, communicating with the dining saloon in the forward house. The engine-room is next aft, and is separated from the owner's quarters by a solid steel bulkhead, direct communication with the deck being had by an iron ladder on the port side. In the engine-room are installed right and left-hand four-cylinder Murray & Tregurtha engines, having cylinder dimensions of 6½ by 8 inches. The engines exhaust into the ventilating funnel. In the owner's quarters the main saloon is arranged aft of the engine-room bulkhead, followed on the port side by a writing room, and having a central passageway leading aft to the owner's double stateroom. Leading off this passageway on the starboard side is a single stateroom, and opposite, a bathroom with full equipment. These quarters are finished in excellent taste with mahogany and enameled woodwork. There are two deeply-cushioned transoms in the saloon which may be used for sleeping purposes.



The main saloon, looking aft through the passageway into the owner's stateroom.



The deck-house dining saloon is arranged with circular transom around the table.

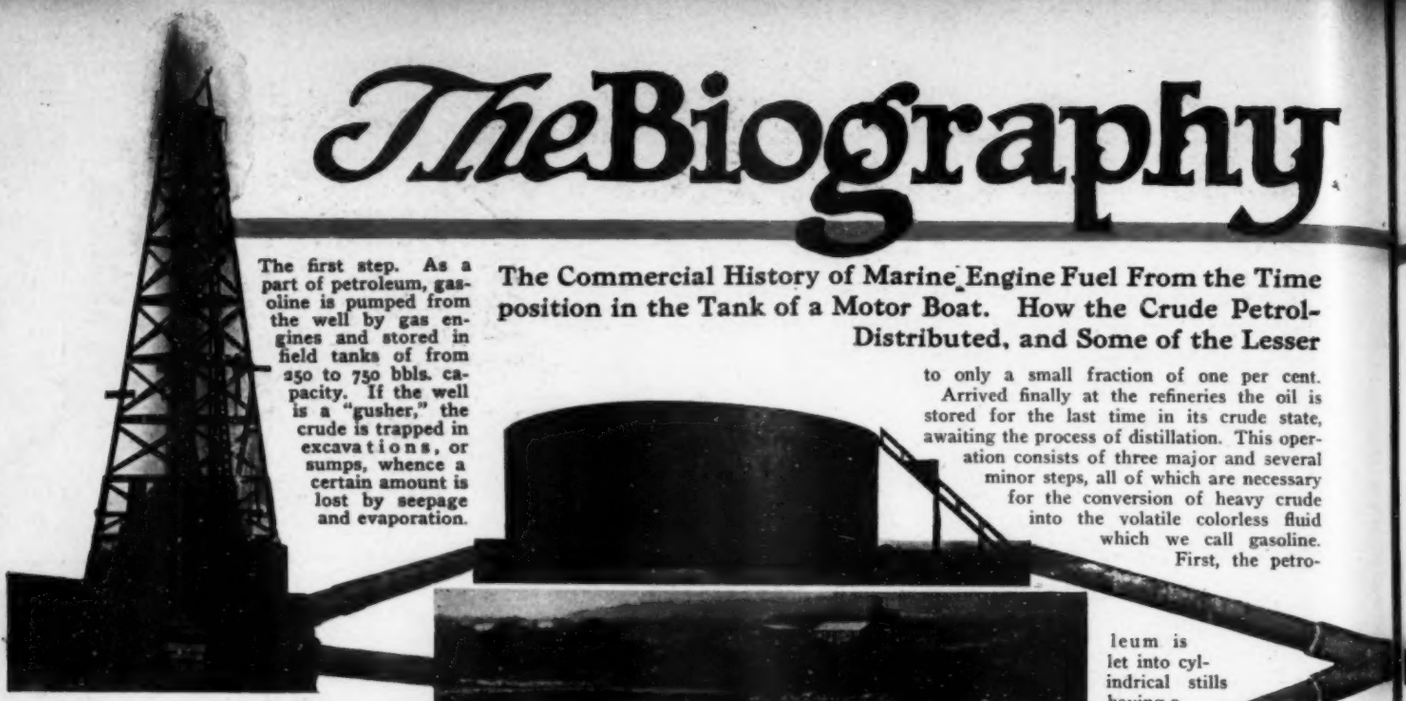
The owner's stateroom.

The main saloon.

Photographs by N. L. Stebbins.

The Biography

The Commercial History of Marine Engine Fuel From the Time position in the Tank of a Motor Boat. How the Crude Petrol- Distributed, and Some of the Lesser

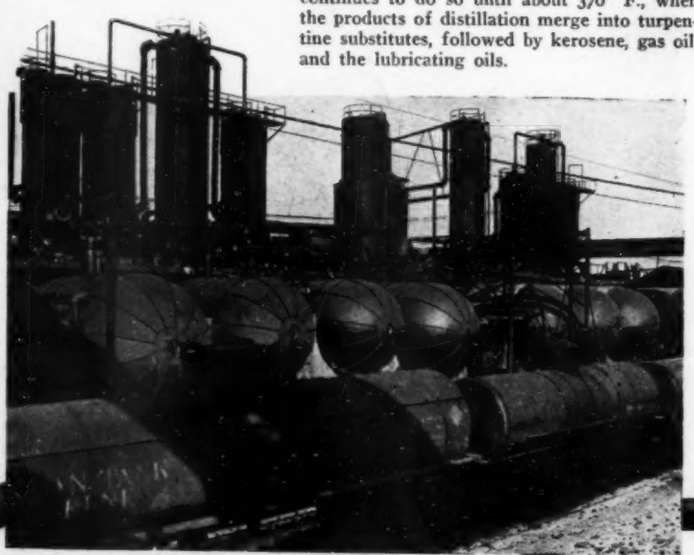


The first step. As a part of petroleum, gasoline is pumped from the well by gas engines and stored in field tanks of from 250 to 750 bbls. capacity. If the well is a "gusher," the crude is trapped in excavations, or sumps, whence a certain amount is lost by seepage and evaporation.

Above, a typical field tank, and below, an oil lake or sump. Oil which flows from a gusher sometimes contains sand which must be caught before the oil is admitted to the pipes.

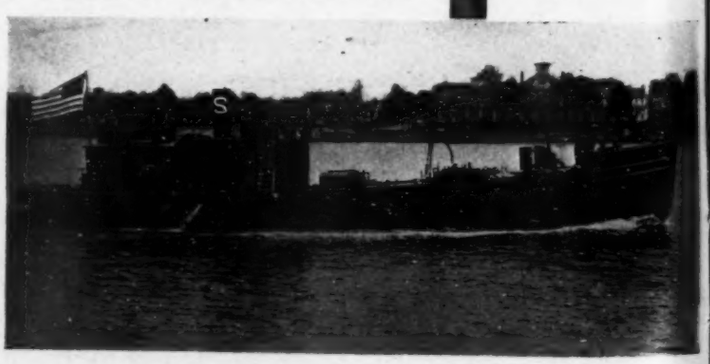
THE commercial history of gasoline from the time it leaves the oil well as a one-tenth content of crude petroleum to its ultimate disposition in the tank of a motor boat, is fully as interesting, though perhaps not so universally known, as the romantic history of the discovery and exploitation of American petroleum. Leaving out of consideration the initial process of boring wells, the accompanying illustrations take up the career of gasoline as it emerges in crude state from the ground. If the well is a gusher the oil is caught in excavations or "sumps" hurriedly dug for its reception, and after the sand and water has been separated from it is pumped to the pipe lines for its long journey to the refineries, but if the well is not of this type, the petroleum is pumped to field tanks, having a capacity varying from 250 barrels to three times that amount, whence, after being measured for quantity by a representative of the pipe line company, it is diverted to the pipe lines.

Some refineries are located 2,000 miles from the fields, their supply being piped for the entire distance, so this branch of the industry is an important one. The trunk lines range from 6 to 12 inches in diameter, the 8-inch being the generally adopted size, and the oil flows through these at the rate of 3 miles per hour. To maintain this flow it is necessary to relay it by pumps stationed at, say, 50-mile intervals. At each pumping station there are large storage tanks, and the impetus which the column of oil has received at the preceding station just suffices to flow it into these tanks, whose contents are withdrawn, tank by tank, by the mammoth pumps, and started on the next leg of the journey. Wastage from the pipes amounts to only a small fraction of one per cent. Arrived finally at the refineries the oil is stored for the last time in its crude state, awaiting the process of distillation. This operation consists of three major and several minor steps, all of which are necessary for the conversion of heavy crude into the volatile colorless fluid which we call gasoline. First, the petroleum is let into cylindrical stills having a capacity of about 600 barrels, which are kept at a slowly rising temperature. At 150° F., varying more or less with different crudes, the naphtha (from which gasoline is later distilled) vaporizes and continues to do so until about 370° F., when the products of distillation merge into turpentine substitutes, followed by kerosene, gas oil, and the lubricating oils.



Gasoline at last! After purification the naphtha is steam-distilled to separate the "auto" gasoline from the varnish naphthas, benzine, etc. The gasoline is led into tank cars for transportation to distributing stations, or—

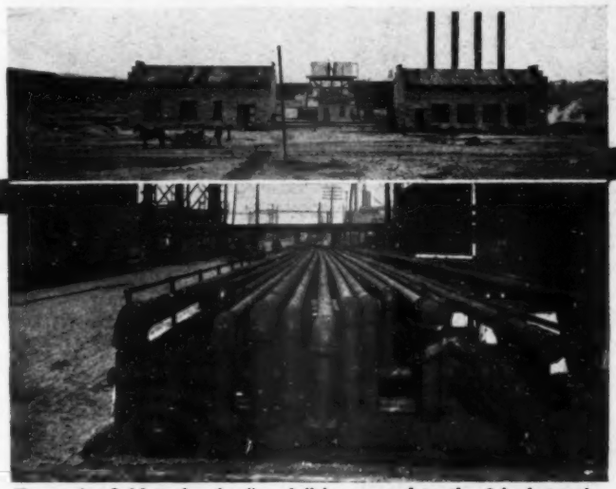
it is barreled for water transport or piped to tank steamers for local distribution to waterfront supply stations.



# of Gasoline

of its Issuance From the Earth to its Final Disposition—How Petroleum is Pumped, Stored, Distilled, Washed and Refined—Description of the Operations of its Refinement.

At the refinery it is stored until needed for distillation. From certain fields the crude is piped 2,000 miles to the refinery.



From the field tanks the "crude" is pumped to the 8-inch trunk lines, whence it is relayed at a 3-mile rate by a string of pumping stations. (Lower) Trunk line terminal at a Bayonne refinery.

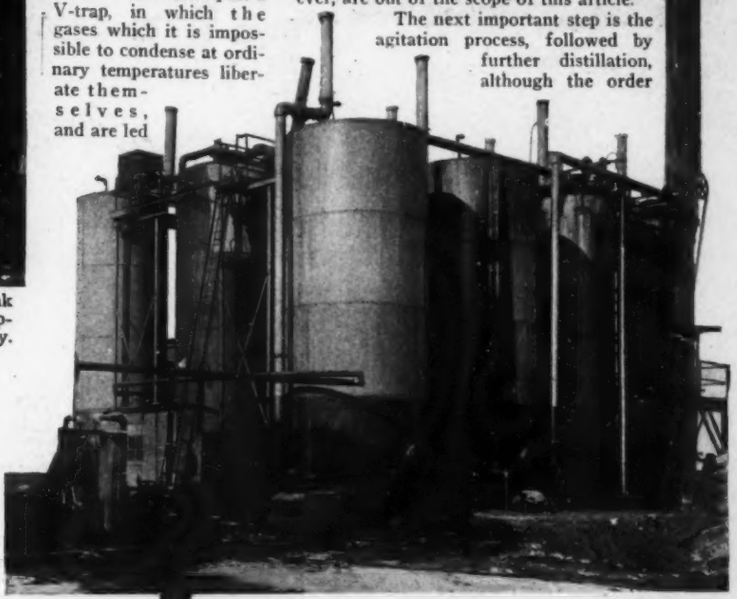
As the naphtha rises in vapor form it is conducted to a condenser, consisting of a series of pipes around which cold water is constantly playing, and as it strikes this area of low temperature, it condenses and flows in liquid form through an inspection box in the testing room where an observer notes its color and makes frequent tests of its specific gravity.

The agitator, in which the naphtha is deodorized and chemically purified of its acids by means of sulphuric acid, caustic soda, etc., forced in by compressed air, and washed out with water.

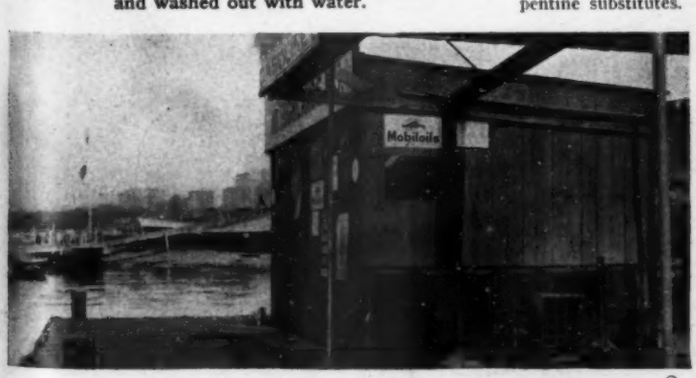
Just before passing through this inspection box, which is similar in construction to the sight feed of a lubricating system, the naphtha flows past a V-trap, in which the gases which it is impossible to condense at ordinary temperatures liberate themselves, and are led back to help feed the fires under the still. It must be understood that as the temperature of the still rises, hydro-carbons of lower specific gravity are constantly liberated, and it is, therefore, the duty of the observer to break the cut when his tests show that the naphtha verges too closely on the turpentine substitutes. This is done when a gravity of 62° (Baumé) is reached, at which time the flow is diverted from the storage tanks for naphtha and turned into the tanks for the next cut. The same process is gone through with for the kerosene, and the still heavier grades of oil, which, however, are out of the scope of this article.

The next important step is the agitation process, followed by further distillation, although the order of these operations is sometimes reversed. The agitators are cylindrical tanks twenty feet

(*Continued on page 47*)



The petroleum is then distilled and the naphtha separated from the less volatile oils. Turpentine substitutes and kerosene vaporize next after naphtha.



From the local station it is a short step to the tanks of the motor boat. In its refined state each gallon of "gas" represents ten gallons of "crude."

Built from —Motor Boating Plans—

View of the forward deck of Wanderer.

The Twenty-five Foot V-Bottom Cruiser Which Was Described In a Recent Issue.

By Siegfried Hannah.

WANDERER, 25 feet, 7½ beam 28 inches draft, was built by my brother (16 years old) and myself (17), with the aid of a carpenter during the last month to do the inside joiner work and also to help out with the bottom planking, the fitting of which required more skill than we possessed.

To outsiders it seemed a rather wild undertaking at first, for the town of Montclair (N. J.), in which we live, is five miles or more from the nearest water, and the lumber we would be likely to get here would be better suited for building a house than a boat; but in this we were happily disappointed.

She was built in a room of a barn made over for a one-car garage. The room was really too small, as we had to prop the doors open and put the stern out through the doorway for about eight feet. Also, the difficulties caused by the narrowness of the room were many and varied. It was then fall, with winter coming on, so we put her as much indoors as possible.

We began work early in September, 1913, by getting the material for the frames, the plans of which we drew out full size on the barn floor. These we soon screwed together. Then, after not a little difficulty, we got a piece, or rather two pieces, of 3-inch oak suitable for the keel, which we had sawed out to shape at a sawmill. The stern post was made out of scraps left over from the keel.

Fastening the planks to the stem.

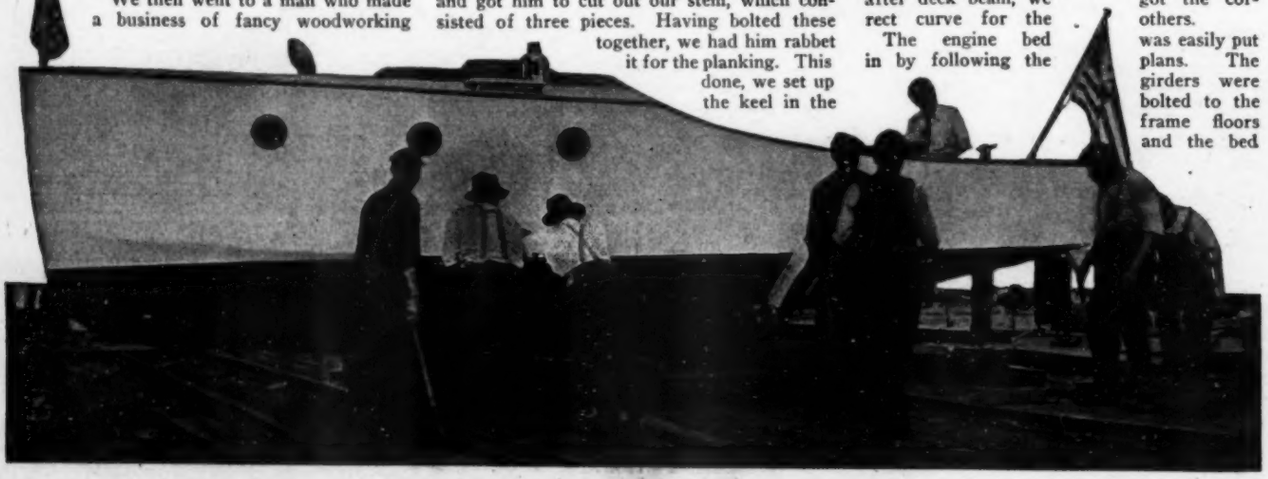
We then went to a man who made a business of fancy woodworking and got him to cut out our stem, which consisted of three pieces. Having bolted these together, we had him rabbet it for the planking. This done, we set up the keel in the barn, bolted the stem piece to it (bracing this upright), and set the stern post in place with lag bolts after we had carefully plumbed and braced it. We bolted the frames in place, squaring and plumbing them to the keel.

The transom we cut out according to the figures given in the plans, and set it in place, backing it well with oak braces.

Next in order came the stringers, spaced eight inches apart above the chine amidships and tapering below both forward and aft.

Then came one of the hardest jobs of all: putting on the clamps. The main deck clamps were easy enough, as they had little twist and bend to them, but when it came to the raised deck clamps, it looked for a while as if we were not going to succeed. The problem was to get those big 2 x 4 pieces of oak over the frail-looking frames and twisted, and then to get them bent and bolted firmly into their proper places. We hadn't the wherewithal to steam them, so we finally had to saw them about half through on the inside, spacing these saw cuts about three inches apart for nearly the whole sixteen feet of the clamps. We were thus able to put them on without breaking the frames.

We then put on the raised deck beams, spaced about fifteen inches apart, these being sawed out of 1¼-inch oak by sheer elbow grease. We put the after beam on first, and by tacking a string to the top of the stem piece and moving the other end along the after deck beam, we got the correct curve for the others. The engine bed was easily put in by following the plans. The girders were bolted to the frame floors and the bed

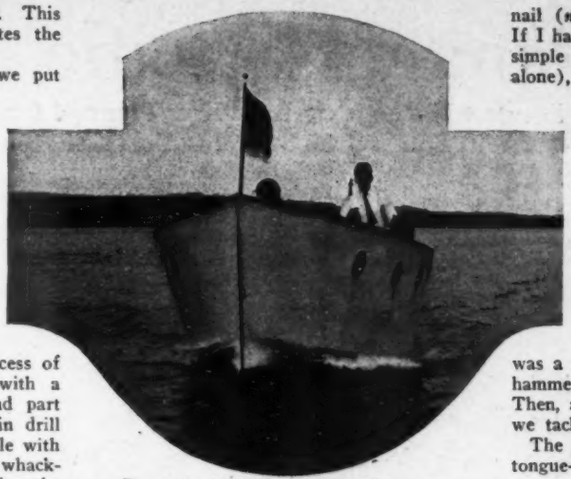


Wanderer, on the marine railway, ready to go overboard.

proper bolted securely to the girders. This plan is an ideal one, as it distributes the thrust over quite a large area.

To further strengthen the frame we put in the bridge deck and the cockpit floor beams, screwing them into place.

For the planking, which was by far the largest and hardest job, we used cypress, as this was easily accessible and ranks next to cedar for boat planking. We started from the chine and worked up, fastening the planking with copper nails spaced three inches apart and clinched on the back of the stringers, and putting in galvanized screws where the nails could not be clinched. The process of nailing consisted of countersinking with a bit, drilling through the planking and part way into the stringer, inserting nail in drill hole, hammering it in as far as possible with the hammer, countersinking the head, whacking the end of your finger, and clinching the nail (*not* the fingernail) on the other side. If I had a cent for every time I repeated this simple operation (I did nearly all the nailing alone), I'd make John D. look like a hobo.



Bow view of Wanderer underway.

When we came to the bottom planking and found after many trials that it was *rather* futile to try to bend an 8-inch plank ¾ inch thick edgewise, we decided that this was a little beyond us; and to make a good job, we called in a carpenter, with whose aid we soon got all the planking on.

We then put into place our raised decking, which consisted of ⅜-inch tongue-and-groove stuff, V'd and center-V'd on one side only. This was a simple matter, as the strips were just hammered close together and nailed in place. Then, after planing and smoothing the deck, we tacked the canvas into place.

The cabin was next ceiled with 5/16-inch tongue-and-groove, the portholes cut through,

(*Continued on page* 50)

An Air Cushioned Runabout.

A Twenty-one Footer with a Beam of Five Feet and a Speed of 20 M. P. H.

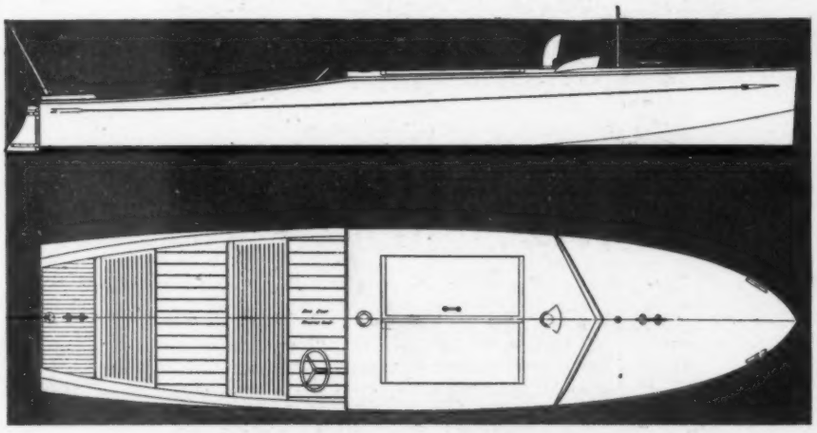
A New Theory Put into Practice that Gives Promise of Great Success.

THE era for standardized motor boats seems to be upon us and the wisdom of this trend cannot be disputed, as the few concerns which have recently given attention to standardized models have turned out craft which have been a decided credit to them and have materially helped in the development of the most successful designs of the day.

The newest of the standardized models is the air-cushioned runabout recently turned out by the well-known designer, Morris M. Whitaker, of Nyack, N. Y., which model is about to be placed on the market. Mr. Whitaker has not jumped at conclusions, but has reached his determination that a fast and seaworthy runabout following these new principles can be turned out at a reasonable figure, only after a large amount of experimenting. In brief, the underbody sections are "bell-shaped," the shape of the bow and other sections being so arranged as to collect the bow wave and some of the water displaced by the movement of the boat through the water and utilize this to make the hull, lift itself out of the water and follow the hydroplane principle more than the real displacement boat does.

The practical success of this idea is borne out by the results of Mr. Whitaker's boat, Whizzer, which has been a familiar sight on the Hudson this past season, being used by the designer for experimental purposes.

This boat, measuring 21 feet in length by 4½ feet beam, weighing 1,880 pounds complete with crew on board, and powered with 20 horse power, 4 cycle, 4 cylinder, Loew Victor motor having a bore of 3½ inches and a stroke of 5 inches, with a 15 x 20-inch Columbia propeller in her original trial was put over an accurate measured course and averaged 20.97 real miles an hour, with and against the tide, under admirable conditions. The average revolutions per minute during the trial were 1,380, which makes the slip figure out very nearly 20%.



Profile and plan of the air cushioned runabout.

Since the above trials were made, the speed has been increased somewhat by certain refinements made by the designer so that a very successful model is assured.

One of the few things discovered from the results with the original boat was that, within certain limits, the amount of beam does not affect the speed, consequently, Mr. Whitaker has increased the beam to five feet.

Whizzer, Mr. Whitaker's 20-foot air-cushioned runabout, which makes 21 miles an hour with 20 horsepower.

The Panama-Pacific Race.

Conditions Governing the Longest Motor Boat Race Ever Planned for $10,000 in Prize Money. The Route Which the Racers Will Follow, the Stopping Ports, the Handicapping Rules, Etc.

WHEN the Yachting Bureau of the Panama-Pacific International Exposition Co., decided to hold a race for cruising motor boats from New York to San Francisco, they made possible the most important event of this character in the history of the sport. The United States is virtually the only country in the world which has encouraged this branch of motor boat racing. From the beginning in 1905 when an "Ocean Race" was run from New York to Marblehead, Mass., to the Bermuda Races and the Philadelphia to Havana Race, not to mention many shorter but likewise deep water events, the motor cruiser has demonstrated its practical worth and safety. A gradual improvement of design and power construction has increased the comfort with which long-distance contests may be participated in, and from the early days up to the present time, there has been no loss of life in any of the events of this character. Indeed, it has been said by accepted authorities that on a modern motor cruiser one is safer at sea than on an ocean liner.

This race will be one where the personal equation will enter largely as a factor towards success. Skilful use of the compass, dead reckoning and chart work will mean as much in a run of this length as mere speed. The race, from its preparation to its consummation, will develop the participants' knowledge of many branches of this healthiest and cleanest of outdoor sports.

The details have been prepared by men, some of whom have taken part personally in long-distance races, and all of whom have officiated in various capacities in similar events. Particular attention will be given to the construction and equipment of each boat, and no boat will be permitted to start if in the opinion of the Committee, she is not seaworthy and able in every particular and in charge of an experienced master and engineer, with capable subordinate assistants.

The "Legs" or relays of the race have been planned so that no one distance between stops will be greater than has already been successfully negotiated as a non-stop competitive run by similarly sized and equipped vessels. Note: the Philadelphia to Havana race was about 1,130 sea miles in length, while the longest leg in the New York and San Francisco race is approximately 1,050 sea miles.

From New York, the course will be a run down the Atlantic sea-board to Charleston, S. C., thence around the Florida Keys to Key West. We now leave "God's Country" and lay our course around the western end of Cuba, then through the Caribbean Sea to Colon. Here we enter Uncle Sam's big ditch, and, passing through the Gatun Locks and Lakes and wonderful Culebra Cut, we begin to step down hill, through Pedro Miguel and Miraflores, into the Pacific Ocean at Balboa (about one and a half miles from Panama). It is needless to dwell on the pleasure to be derived from such an intimate association with this wonderful example of engineering skill. Illustrated lectures, personally-conducted tours, cruises, etc., could not begin to give one the insight into the actual workings and wonders of the Canal that a trip through it on a small vessel would, where a man has his share of responsibility.

From Panama we follow the beach to Corinto, Nicaragua. Thence following the shores of Salvador and Guatemala to Salina Cruz, Mexico. We now have one more stop, San Blas, in a foreign country, then across the Gulf of California and along the coast of Lower California to San Pedro, back to the Stars and Stripes. From here it is a comparatively short run to San Francisco, where each boat will be convoyed through the Golden Gate to the finish.

Complete information will be provided for the contestants as to the anchorages, reporting places, supply stations, etc., at each port. There will be officials on duty at accessible points night and day until all boats have reported and been checked out. There will be seventy-two hours obligatory stop required, to be divided according to the desires of each contestant, giving an average stop of about ten hours and a quarter at each port exclusive of Panama. An additional forty-eight hours will be allowed, and must be taken, from the time each boat leaves Colon till it leaves Panama. This provides for a very leisurely Canal passage, or a long rest at Panama (Balboa). The total stops aggregate five days, or a long rest credited to each finisher in computing his total elapsed time, provided his checking cards are duly executed by the proper official at each stopping place. Any other stops are at the contestants' discretion, and will not be credited.

There is no part of this trip which could be called perilous for a modern well-equipped motor boat. Most of the course is laid along shore, and the stretches which leave the beach are in line of frequent communication with fruit steamers and other coastwise traffic.

A most cordial reception awaits the finishers at San Francisco, where every honor and attention will be paid the pioneers in a contest which will receive world-wide notice.

The Panama-Pacific International Exposition Company has appropriated $10,000 for prizes in this race. A certain percentage of this amount (5 to 10 per cent.) will be reserved for suitable commemorative trophies for finishings. The balance will be given to the finishers in cash as follows: each boat will receive one point for finishing, and one point for each boat she defeats. The cash will be divided among the finishers according to the number of points awarded. For example, in the case of six finishers, there will be a total of 21 points awarded. The first boat will receive 6/21sts of the money, the second boat

(*Continued on page 48*)

A New Coaching Launch for the Yale Crew.

YALE, a 30 ft. x 5 ft x 22 in. displacement hull from the designs of H. L. Friend, is a very powerful hull, as well as a speedy craft, recently presented to the Yale Rowing Association by Mr. John M. Goetchius, one of the really interested men in the Yale Alumnæ, who is constantly in touch with the crews. The double cockpit type with the engine housed amidships allows the coach to sit and talk to the men in an ordinary tone of voice while the engine is running idle. All the controls are brought to the steering wheel aft, and are in charge of a launch man who sits on an elevated seat to give him clear vision of the crew.

The gasoline engine of to-day has become so flexible that it is far ahead of steam, and the coach never finds himself left behind. A foot pedal control is installed, and when the crew gets ten fast ones at the start the coaching launch is right in position.

As head coach Nickalls said: "I want to be as close as you can keep me to the crew—the closer the better, but never hit them." Yale was used this last August on the New England coast as the demonstration boat of A. P. Homer, carrying a new R 1 50-55 Sterling. This gave her a speed of 21½ knots. She cruised East as far as Seal Harbor. Yale is now equipped with a 20-35 and this gives her a speed of 17½ miles at 1,000 r.p.m.

She was delivered on her own bottom on Oct. 5th. She left the Quincy Yacht Club at 7.30 a. m., Sunday, Oct. 4th; Boston Light, 8; Minots Light, 8.21; Brant Rock wireless station, 9.13; Gurnet Point, 9.31; Monument Point, 9.58; Cape Cod Canal Entrance, 10.34; Wings Neck Light, 11.30; Black Spar of West Island, 12.09; New Bedford, 1.10; stopped for gasoline (20 gallons), 1.10; inside Hen and Chickens, to Point Judith, 4.00 p. m.; New London, 5.50; tied up over night, thick outside. Oct. 5th still thick, held on till 10 a. m. Put in 20 gallons gas, proceeded to New Haven, arrived at Yale boat house 1.15 p. m., one hundred and sixty-nine and five-eighth nautical miles in 12 hours and 35 minutes.

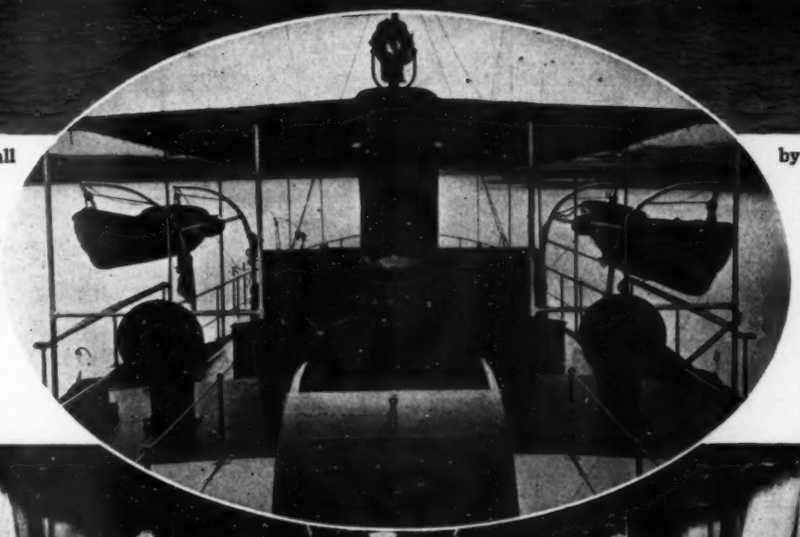
Mr. Nickalls is greatly pleased with the action of Yale. She slows down to 100 r. p. m. and will jump to 1,000 in 2⅕ seconds. The crew never gets away beyond the stern of the shell. Yale catches them from stop to full speed in 50 feet. Several other varsity crews are coached from gasoline driven launches.

Yale, a 17½ miler, used by the Yale Navy for coaching.

The Raised Deck CATALINA

Catalina is 63 feet overall by 13 feet 6 inches beam.

THE accompanying photographs show Catalina, designed and built by F. S. Nock, of East Greenwich, R. I., for Mr. Chas. S. McCulloh, of New York City. The general dimensions are: L. O. A., 63 ft.; L. W. L., 57 ft. 6 in.; beam, 13 ft. 6 in.; draft, 4 ft.



Above: the saloon, looking aft into the owner's stateroom.

The boat was designed as a family boat, the entire quarters aft of the engine-room bulkhead being devoted to the owner and family. Directly aft of the bulkhead is a galley fitted with Shipmate stove, deck-filled ice box, etc., and next aft is the saloon with sleeping accommodations for four people, folding table, buffet, etc. Aft of this is a bathroom with tub, toilet and basin, and opposite it on the port side, a single stateroom. The owner's stateroom is at the stern.

The combined crew's quarters and engine room extend aft to the galley. The engine-room equipment comprises a direct-connected Fay & Bowen 1 k.w. electric set, work bench, gravity-feed water tank and air storage tank. The main power plant is a four-cylinder, 8 x 10 in. four-cycle 20th Century engine.

Engine-room, showing main and auxiliary power plants.

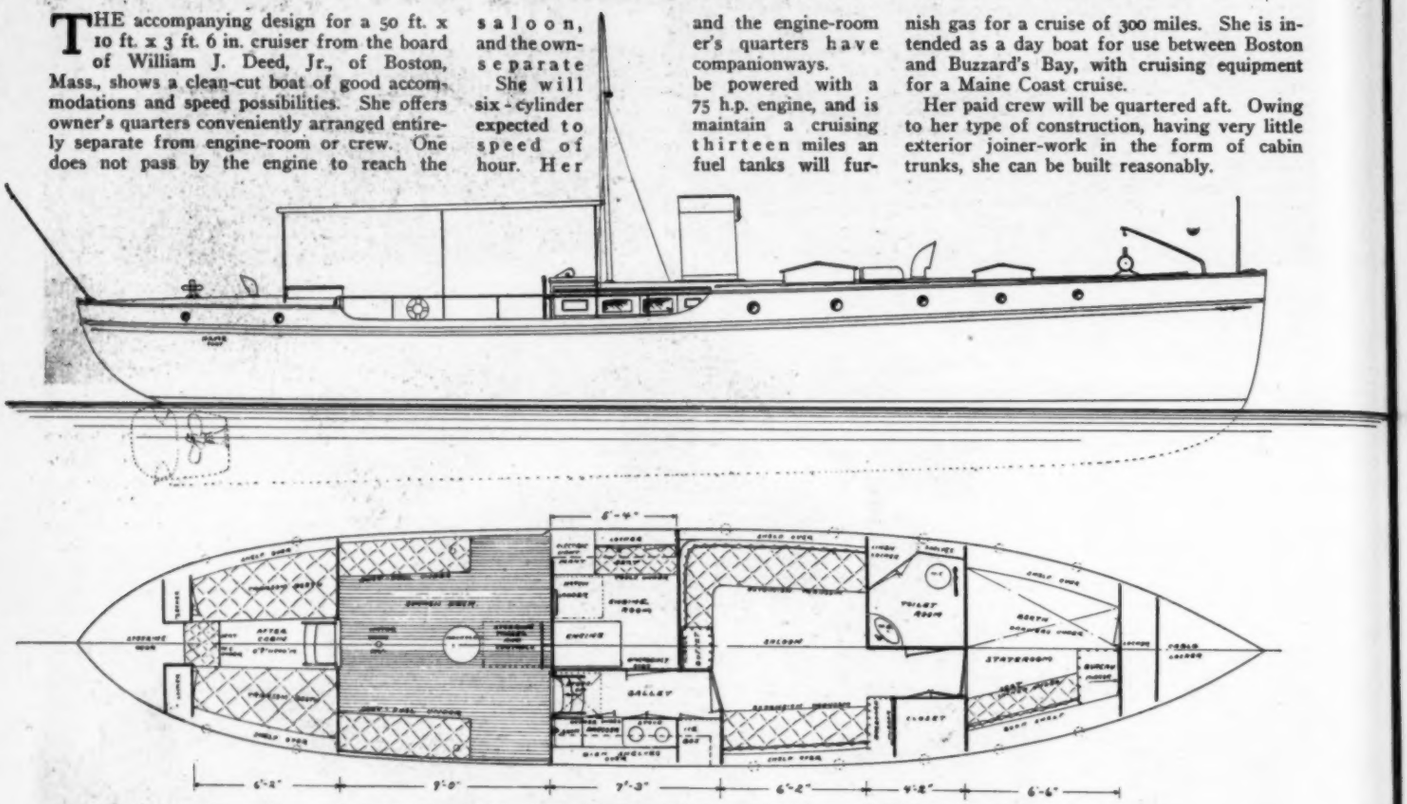
A 50-Foot Down Easter.

A Clean-Cut Day Cruiser Having 300-Mile Fuel Radius for Use Along the Coast of Maine. Having Owner's Quarters Forward with Engine-Room Isolated by Bulkheads.

THE accompanying design for a 50 ft. x 10 ft. x 3 ft. 6 in. cruiser from the board of William J. Deed, Jr., of Boston, Mass., shows a clean-cut boat of good accommodations and speed possibilities. She offers owner's quarters conveniently arranged entirely separate from engine-room or crew. One does not pass by the engine to reach the saloon, and the owner's quarters have separate companionways.

She will be powered with a six-cylinder 75 h.p. engine, and is expected to maintain a cruising speed of thirteen miles an hour. Her fuel tanks will furnish gas for a cruise of 300 miles. She is intended as a day boat for use between Boston and Buzzard's Bay, with cruising equipment for a Maine Coast cruise.

Her paid crew will be quartered aft. Owing to her type of construction, having very little exterior joiner-work in the form of cabin trunks, she can be built reasonably.



A 50-footer having little exterior joiner-work in the form of cabin trunks.

Voyageur, A Limousine Runabout.

Having Cockpit Aft Housed with Aluminum Body-Top with Pullman Curtains and Glass Windows. Original Features Include Streamline Deck and Sidelights Screened by Raised Engine Hatch.

VOYAGEUR is a 40 x 7 foot express runabout capable of reeling off 30 miles an hour, built by Hutchinson Bros., of Alexandria Bay, for Mr. Houston Barnard, of Rochester, N. Y. The boat is particularly interesting because of a number of original features incorporated in its design and equipment. For instance, a notable departure from convention is in the design of the top. The after part of the cockpit is housed with an aluminum limousine body-top with generous rounded lines and upholstered throughout in gray and blue waterproof material. It is open forward, but by reason of the folding top covering the forward part of the cockpit, the windshield, and the side curtains, protection is offered against the most severe rain storm.

The after cockpit floor is covered with cork linoleum and rugs, and the floor of the driver's cockpit is formed of removable hatches in white rubber tiling, heavily brass-bound. At the forward end of the cockpit are two bucket seats, separated to provide a passage aft.

The forward deck is raised in a graceful streamline, a width just outside the hatch up and over the central bulkhead forming a cowl hood. The raised hatch provides angles for the running lights without screenboards. All lamps are built with double walls and hinged doors, carrying triplex glass lenses and 12-volt electric lamps.

Voyageur is a 30-mile 40-foot runabout, owned by Mr. Houston Barnard, of Rochester, N. Y.

The limousine body-top.

The motor equipment is an eight-cylinder, 150-180 h.p. Sterling equipped with a North East electric starting and lighting outfit with a 24-volt battery. All controls are from the operating bulkhead which is well supplied with instruments, including eight Loomis gauges for registering the action of each cylinder.

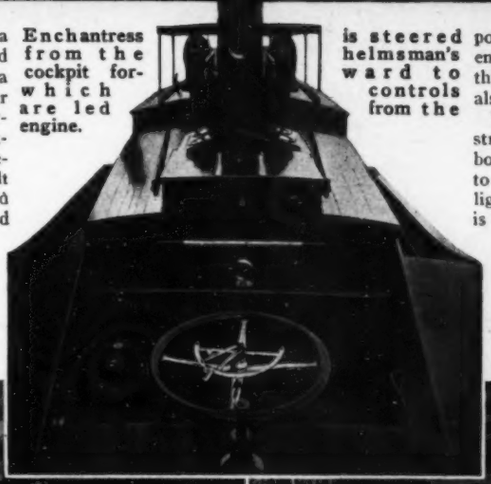
ENCHANTRESS

THE accompanying photographs are of a motor boat of the express type, designed by Bowes & Mower, the Philadelphia naval architects. Enchantress is 46 feet over all and a speed of 22 miles per hour is guaranteed. She is fitted with a Loew-Victor engine of 7½ and 8½-inch bore and stroke, developing about 180 h.p. The engine was built especially for this installation, and is placed under a low trunk cabin, where it is controlled from a steering cockpit forward as well as from below.

Accommodations consist of a large cockpit aft, 13 feet long with a seat at the after end and open space for chairs. The main cabin is 9 feet long, with 5 feet 8 inches headroom, and has wide, full transoms with large drawers under. Opening from the forward end of the cabin on the port side is a toilet room and on the starboard is a door into the engine-room. The ice chest is conveniently located in the engine-room. At the forward end there are an alcohol stove and sink, so that cooking may be done if necessary. On the port side is a berth for the engineer. The engine exhaust is carried aft and out through the transom with a cut-out up the stack, which also provides engine-room ventilation.

The boat is lightly constructed, but ample strength is provided for the service which a boat of this type can reasonably be expected to perform. The frames and planking are light, but longitudinal strength and stiffness is obtained by a well-designed system of engine keelsons and side stringers. The planking is selected white cedar and the decks, houses, and all deck joiner work is mahogany. To save weight the stack and ventilators over the engine-room are made of aluminum.

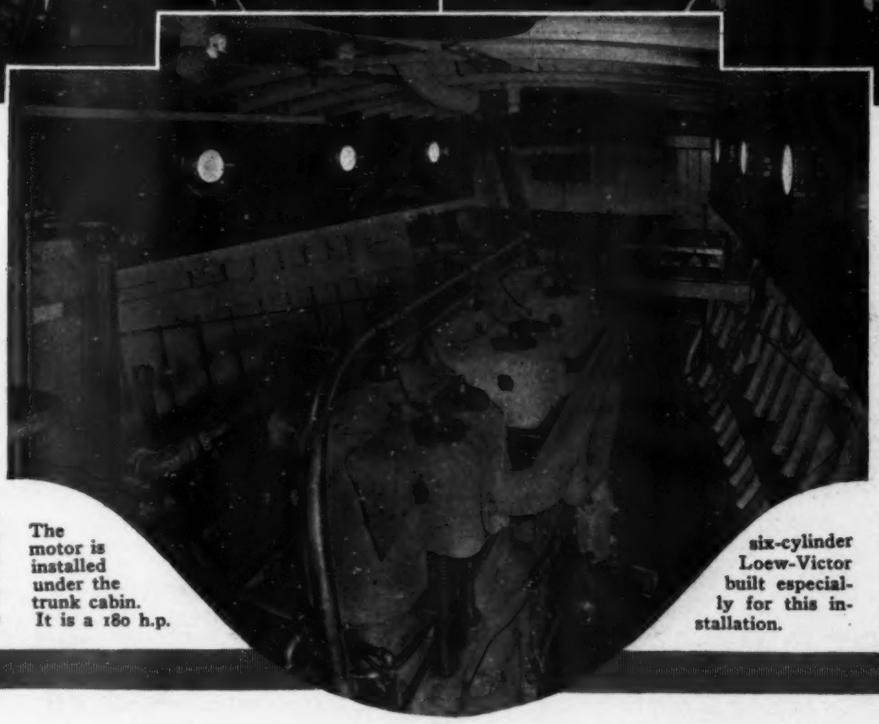
Photographs by Pearce.



Enchantress is steered from the cockpit forward which helmsman's ward to controls are led from the engine.

The cabin is tastefully finished in mahogany.

Looking forward to engine-room passageway.



The motor is installed under the trunk cabin. It is a 180 h.p. six-cylinder Loew-Victor built especially for this installation.

Enchantress is of a type which her designers have been developing for several years, and she should attract considerable attention from those interested in cruisers of the express type. On her trial trip she more than equalled her guaranteed speed.

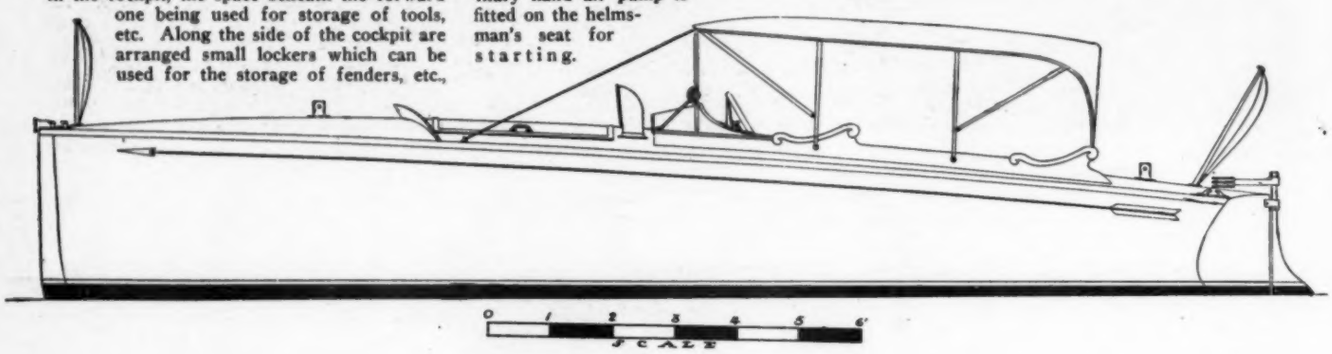
Enchantress was built by the Essington Ship Building Co., at Essington, Pa. She measures 46 feet by 8 feet 5 by 3 feet 4.

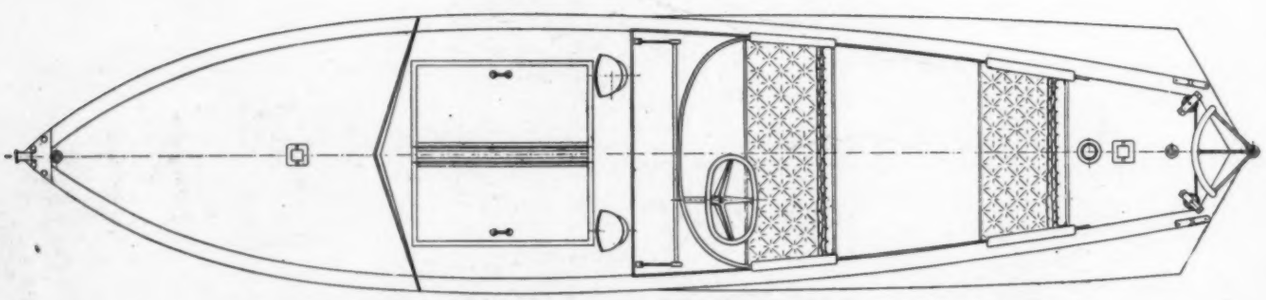
A Luxurious 20-Foot Runabout.

Employing Mahogany for the Under-Water Planking, Decks, Coaming and Interior of Cockpit. Aluminum Apron Over Forward Part of Cockpit, Glass Windshield and Top, Other Features.

THE accompanying drawings illustrate a fast runabout designed by Wm. Edgar John, of Philadelphia, for a yachtsman of Buffalo, N. Y. The designs show a boat of a moderate hogged shear with considerable flare forward and a well crowned forward deck, under which is installed a 4-cylinder Sterling Kid motor. The steering wheel is of the automobile type, with the spark and throttle controls mounted upon it. The motor is started and controlled from the helmsman's seat. There are two athwartship seats in the cockpit, the space beneath the forward one being used for storage of tools, etc. Along the side of the cockpit are arranged small lockers which can be used for the storage of fenders, etc., and on the port side the exhaust pipe is led under this locker. The floor of the engine compartment and that just after the bulkhead is covered with pyramid aluminum and the after cockpit with white tiled linoleum. A 15-gallon seamless steel gasoline tank is installed under the after deck. The gasoline is forced from this tank by pressure taken from the engine, which is fitted with a Lunkenheimer pressure regulating valve to a small 1-gallon auxiliary tank located forward, from which it feeds by gravity to the carbureter. An auxiliary hand air pump is fitted on the helmsman's seat for starting. The decks are of mahogany made in narrow strips, seams filled with yellow seam composition. The interior of the cockpit and coaming is of mahogany, all the deck fittings and rudders are of polished bronze and the upholstery is of green Spanish leather Over the forward part of the cockpit is fitted an aluminum apron. There is a glass spray shield arranged to fold down and an automobile top completes the equipment.

The boat is 20 feet overall, 4 feet 6 inches beam, 20 inches draft and her speed is 14 m.p.h.



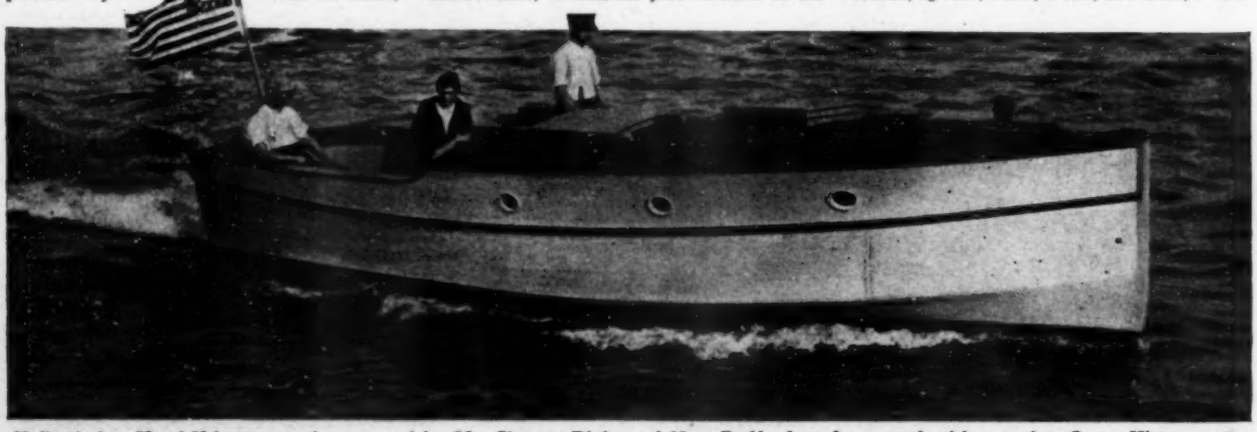


A 20-foot fast runabout, having considerable flare, crowned deck and hogged shear.

Valkyrie, a Sturdy Little Cruiser.

A STURDY little Hand V-bottom cruiser is Valkyrie, owned by Mr. Chester Ripley, of New Bedford, Mass., and shown in the accompanying illustration.

Valkyrie was built at New Bedford last spring from plans by Wm. H. Hand, Jr., and has proven a most satisfactory boat with good speed and commendably seaworthy qualities. There is a comfortable little cabin with good accommodations, and a big, roomy self-bailing cockpit, having a lazy-back seat at the after end. The motor, which is a 12 h.p. Loew-Victor, is installed just forward of the main cabin bulkhead with all controls led to the steering wheel on the port side of the cockpit. The companionway extreme is on the starboard side, and the deck line is further covered by a ventilating hatch forward. The general dimensions of Valkyrie are, length overall, 25 feet; beam, 8 feet, and draft, 2 feet.



Valkyrie is a Hand V-bottom cruiser, owned by Mr. Chester Ripley, of New Bedford, and powered with a 12 h.p. Loew-Victor motor.

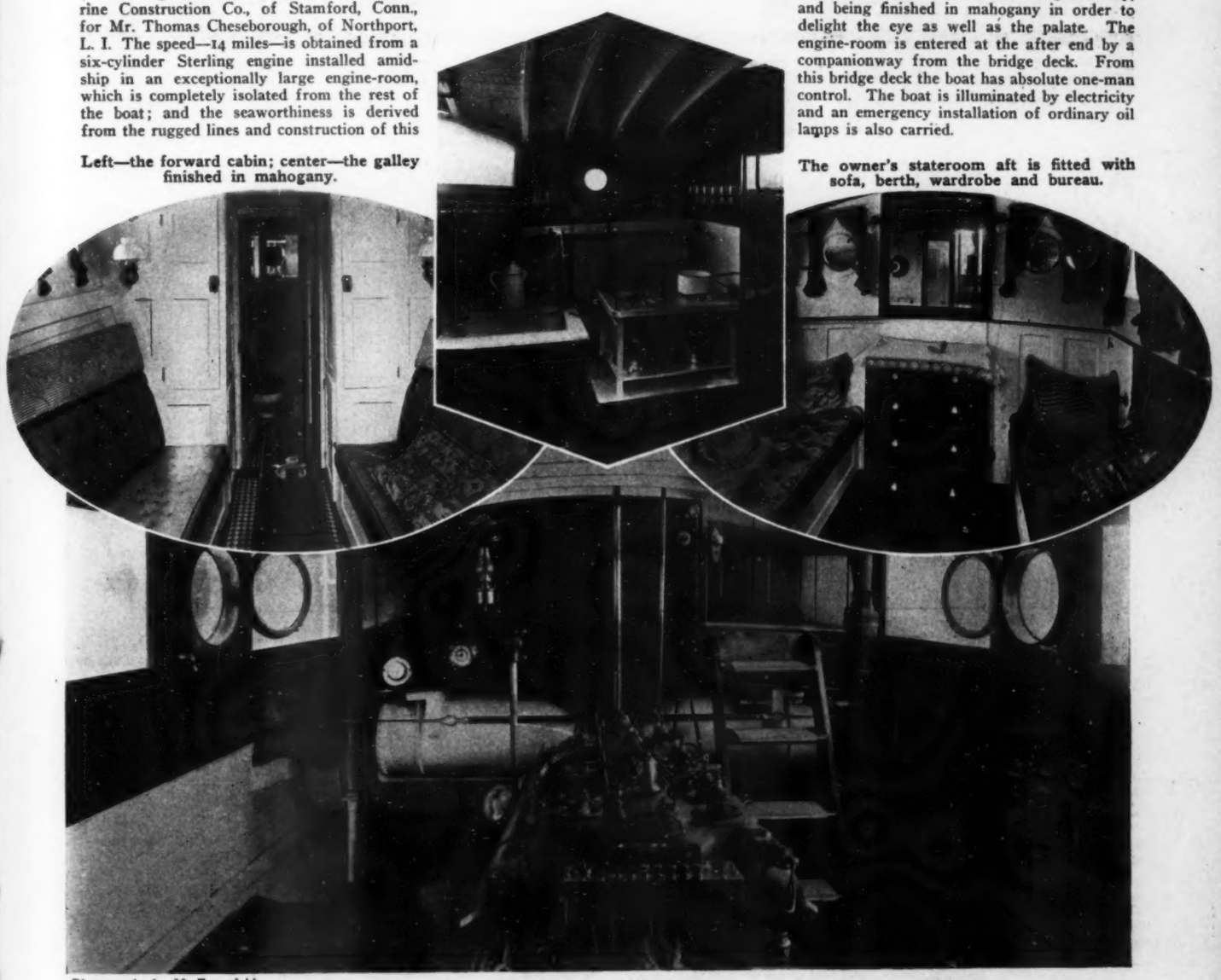
ROMANCE

A fast 50-footer designed to withstand all varieties of Long Island Sound weather.

A TYPE of boat combining speed and seaworthiness is exemplified in Romance, designed and built by the Luders Marine Construction Co., of Stamford, Conn., for Mr. Thomas Cheseborough, of Northport, L. I. The speed—14 miles—is obtained from a six-cylinder Sterling engine installed amidship in an exceptionally large engine-room, which is completely isolated from the rest of the boat; and the seaworthiness is derived from the rugged lines and construction of this 50-footer. The living quarters, consisting of large stateroom and bath are located aft of the engine-room and the saloon and galley are forward of it, the galley also serving as vestibule from the forward companionway, and being finished in mahogany in order to delight the eye as well as the palate. The engine-room is entered at the after end by a companionway from the bridge deck. From this bridge deck the boat has absolute one-man control. The boat is illuminated by electricity and an emergency installation of ordinary oil lamps is also carried.

Left—the forward cabin; center—the galley finished in mahogany.

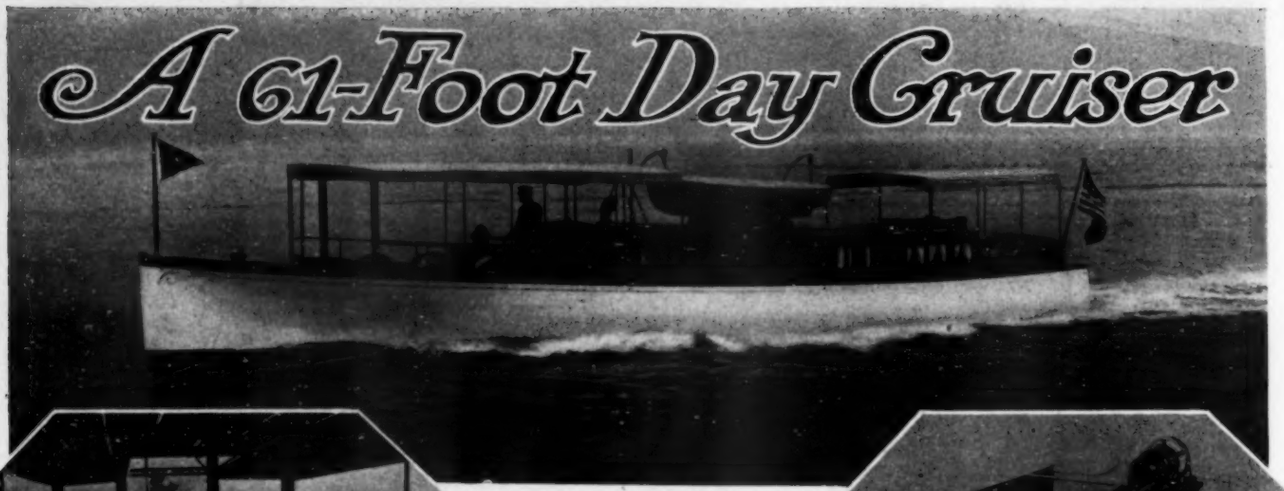
The owner's stateroom aft is fitted with sofa, berth, wardrobe and bureau.



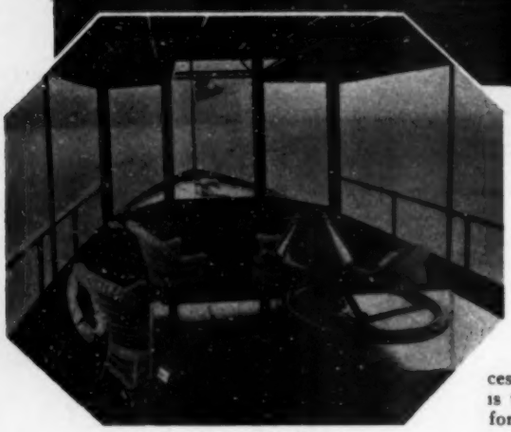
Photographs by M. Rosenfeld.

The engine-room, which is of exceptional size, is equipped with a six-cylinder Sterling engine. The gasoline tanks are installed in an extension of this compartment beneath the bridge deck.

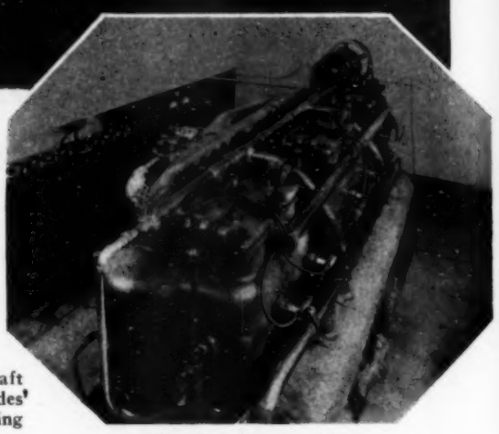
A 61-Foot Day Cruiser



Aura develops a speed of 19 miles.



The forward cockpit.



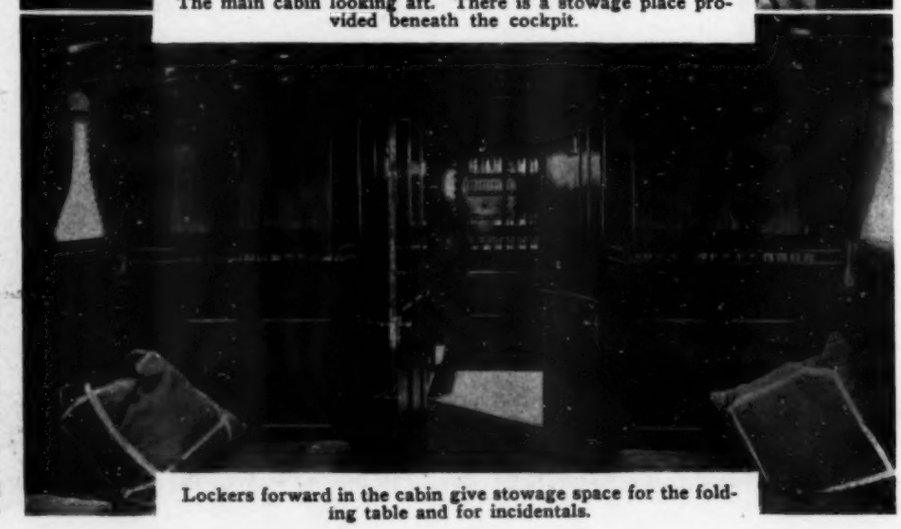
The Speedway engine.

Photographs by M. Rosenfeld.

AURA was built for Mr. A. H. Morris, of New York City, by the Gas Engine & Power Co. and Charles L. Seabury & Co., Consolidated, of Morris Heights, New York, and is 61 feet over all, 10 feet 6 inches beam by 3 feet draft. She is constructed of wood with oak keel and frames and cedar planking, and is mahogany finished. There is a trunk cabin forward, followed by a cockpit for the owner and the steersman, with awning over and windows at the forward end, arranged to hinge up under the awning. This cockpit is self-bailing. The steering wheel and engine controls are arranged in the forward part of the steersman's cockpit, with a seat arranged on the starboard side aft. The fuel tank of 350 gallons capacity is located under this cockpit.

The motor compartment is next aft. A passageway is arranged from the steersman's cockpit to the galley, running along the port side of the motor compartment. Next aft of the motor compartment is the galley, fitted with a four-hole Speedway alcohol range, enameled porcelain sink, with pump, etc., ice box, dish rack, drop leaf table and glass rack. On the port side, opposite the galley, the toilet room is arranged, provided with all the accessories necessary for its complete equipment. Next aft is the cabin, with large lockers on both sides forward, the locker on the port side being arranged for stowage of the cabin table when not in use. On either side of the cabin, following the lockers, is arranged a wide transom seat.

The main cabin looking aft. There is a stowage place provided beneath the cockpit.



Lockers forward in the cabin give stowage space for the folding table and for incidentals.

Stowage space aft of the cabin is provided under the deck. The after cockpit is next, with entrance to the cabin. A water tank of 100 gallons capacity is arranged under this cockpit floor. A thwart seat is arranged at the after end of cockpit, with upholstered leather cushion and mahogany backboard. This cockpit is also of the self-bailing type.

The motive power consists of a 6-cylinder, 2 inch by 8 inch Speedway gasoline engine of latest design, which develops 200 h.p. This motor is complete in every way, with Bosch high-tension magneto, McCord force feed oiler. The spark and throttle controls are arranged at the steering wheel, and the reversing mechanism is located conveniently for the operator.

PRIZE CONTEST in Questions & Answers

Changes in One's Power Plant.

The Experience Gained this Year Which Will Have an Influence Next Season. Two and Four-Cycle Practice Considered, as Well as the Auxiliaries.

Two-Cycle Changes.

(The Prize Winning Answer.)

IN order to prevent all the trouble which I experienced while operating my motor during the season of 1914 I intend making the following repairs.

It is a 2-cylinder, 2-cycle affair, which consisted of rusty parts when I bought it in the spring, but nevertheless the trouble it gave me has taught me a great deal about marine engines and with a little overhauling it should run perfectly.

After installing it in the boat the first thing to cause trouble was the alignment. When the clutch was thrown in the engine would stop. This was overcome temporarily by putting shims under the clutch, but in order to obviate this trouble entirely the engine and clutch will be bolted to a piece of wrought iron, about ½ in. by 4 in., and this in turn will be fastened to the bed, insuring perfect alignment of these two members while the shaft is taken care of by a flexible coupling.

The exhaust pipe was also a source of trouble. When the engine was idle and the boat rocking about, the water would run into the outlet, which was on a level with the waterline, and roll up the pipe to the cylinders. This nuisance was offset by inserting a wood plug, but as time will now permit, the exhaust pipe will be run outboard about a foot or so above the waterline and a water-cooled muffler will replace the present "fire box" which is wound with asbestos.

Two hexagon nuts were used on each bolt to connect up the crankshaft bearing, one supposed to lock the other, but these would always seem to work loose and, as they did in my case, broke off after giving the crankcase a few raps. With this method it was also hard to get the right pressure on the bearing, it either being too tight or too loose. These nuts will be replaced by castellated ones, which after they have been taken up can be locked by a cotter pin passing through them and into the bolt.

Carbon, too, has been a "jinx" and on one occasion a heated piece of it deposited on the cylinder wall kept the motor running steadily after the switch was turned off. This might have resulted in our boat crashing into a lock gate had it not been for the clutch and was finally overcome by shutting off the gasoline supply. This carbon will be removed by soaking with kerosene and rubbing with a rough rag or, if necessary, by scraping with a steel blade; but care should be taken not to mar the cylinder walls.

A knock which one will not usually locate readily is that caused by a loose flywheel. I ran a whole day before I discovered that it was the loose key that had permitted the flywheel to keep up that infernal vibration. When the key was driven tight this led to the discovery of why the flywheel was out of true, the key forcing it off center. This will be trued up by placing a thin shim of copper between the flywheel and the shaft and possibly another shim on one side of the key to make its hold positive. In connection with the flywheel, a pan of either copper sheet or galvanized tin will be placed under it to prevent it from sending the bilge water aviating and usually landing it on the ignition or somebody's clothes.

As for the ignition, little will be done with it except to place patent clips on the ends of all wires, for one stray strand will short-circuit the whole system and cause you hours of work trying to locate it.

With the above repairs, a few new gaskets, proper carburetion, a good spark and in view of the fact that the bearings are new I look forward to another season free from worry and dirty work.

J. K. B., Brooklyn, N. Y.

Questions for the January Issue.

1. From your experience of the past season, what changes in the arrangement of your boat or its equipment would you recommend to increase the cruising comfort.
Suggested by D. G. S., Norfolk, Va.

2. Explain and illustrate an approved method of fastening the frames to the keel and fitting the floor timbers for the most strength.
Suggested by W. B. M., Newburgh, N. Y.

3. Is it good policy to use cement or other plastic material in the bilge of a boat, and if it is, what is the best material and method of applying it?
Suggested by E. W. M., New York City.

RULES FOR THE CONTEST.

Answers to these questions, addressed to the Editor of MoToR BoatinG, 119 West 40th St., New York, must be (*a*) in our hands on or before November 25, (*b*) about 500 words long, (*c*) written on one side of the paper only, (*d*) accompanied by the senders' names and addresses. (The name will be withheld and initials or a pseudonym used if this is desired.) Questions for the next contest should reach us on or before the 25th of November.

The prizes are: For each of the best *answers* to the questions above, *any article* advertised in the *current issue* of MoToR BoatinG, of which the advertised price does not exceed $25, or a credit of $25 on *any article advertised* in the *current issue* of MoToR BoatinG which sells for more than that amount. (*There are three prizes—one for each question—and a contestant need send in an answer to but one if he does not care to answer all three.*)

For each of the questions selected for use in the next contest, *any article* advertised in *this issue* of MoToR BoatinG, of which the advertised price does not exceed $5, or a credit of $5 on *any article* advertised in *this issue* of MoToR BoatinG which sells for more than that amount.

Several Improvements Suggested.

OUR log for 1914 shows that we have cruised 948 nautical miles up to September 13, 1914. In that time trouble has been experienced with air compressor, bilge pump, water piping, exhaust piping, connecting rod brasses, coils, wiring and reverse gear.

The trouble with the piping lay in crystallized pipe threads resulting from engine vibration. To reduce vibration it is pro-

When you send in your answers state what you will take for a prize should you win one.

posed to stiffen up the engine foundation. Those of us who come in contact with machinery installations aboard ship know that all piping in machinery spaces is copper with brazed flanges. It is believed that this practice should be extended to the piping on motor boats. Our exhaust line as originally installed was of brass; after repeated thread failures we have replaced the entire line with the exception of the tail piece with black iron pipe and cast iron fittings. To take it down we use a hammer, breaking the fittings, but it stays on the job. The water piping is brass, but instead of an elbow and close nipple we use the much stronger street or service elbow wherever possible.

The air compressor is of the water-cooled-burned-gas type. Last year at the end of every 250 miles we would have to take the compressor and piping down and clean out the carbon. This year the same trouble was experienced, but this time we put in ¼ in. I. P. S. brass pipe and a ¼ in. I. P. S. vertical check valve and since have had but once to clean out the check. The small copper tubing and ball check valves furnished with the compressor were too small to be suitable for continuous service.

Our reverse gear is of the multiple disk type. We found that the brake band failed to hold in the reverse through the cam cutting into the ears on the band and thus limiting the throw. To remedy the above the slot in the post was lowered which allowed the designed cam throw.

Our bilge pump troubles were ones of check valves and water packing. Our experience has been that ball check valves having a larger area through the valve for the same size are superior to lift checks. The most satisfactory plunger packing is a piece of rawhide cut to the proper width and twisted so as to form a spiral packing of appropriate diameter. The above is real "dope" on small pump packing. The rawhide will stand almost indefinite wear.

We wired the boat originally with lamp cord and found the same not serviceable. This has been taken out and flexible armored cable substituted, the armor consisting of a brass half round wire wound on the cable, the insulation being varnished cambric covered with braid before armoring. This wire will never require renewing, it is oil-proof and will stand abrasion. From the switchboard to the battery No. 10 wire was used with improvement in voltage. In low voltage systems no wiring smaller than No. 14 should be used while No. 12 is to be preferred.

We pounded out one connecting rod bearing; the only remedy is to put in a new one and see that it is properly keyed up. Last year we used a paper liner and evidently it disintegrated and caused the trouble.

The ignition system was originally a coil system with the usual vibrator troubles. A good master vibrator cured the coil troubles and is strongly recommended.

In extended cruising, reliability of equipment should be the first consideration. In overhauling, nothing but the best materials should be used. If the boat is to be laid up all metal surfaces should be coated with a good grade of steam engine cylinder oil; this requires removal of the pistons. The overhauling should be done in the spring, as the engine should be taken down before going in commission to remove the "slushing" compound applied when laying up.

D. G. Stanbrough, Norfolk, Va.

Based on Real Experience.

In general: Do everything yourself. Trust no workman. Take nothing for granted. Inspect each part yourself. Avoid stunts. "Certainty" as well as "safety first."

Cylinders.—Clean cylinders and base during each run by opening petcocks in the water circulation. Avoid sucking water from exhaust into cylinders by never turning the engine backward or starting it with the spark advanced. Force water out if sucked in with petcocks out and pump it out with the oil gun through the spark plug openings. Dry plugs in the flame. Discard rings with gap over 1/64 of an inch cold, which closes when hot and holds compression. Avoid temperature of cylinders not stationary and bearable, but rising and unbearable. Correct first "squeak" of dry part and first rattle of loose part. Keep gaskets tight.

Valves.—File feather edge from valves and seats after grinding to avoid loss of compression and smudging. Discard deeply burned valves, whose regrinding may change adjustment of engine. Compare valve springs with new stock and discard any short or weak by use and heat. Renew valve cage gaskets, which soon leak from pressure and heat. Set valves with flywheel marked for all services, both opening and closing.

Petcocks.—Discard leaking petcocks. Regrinding is loss of time, as the bodies spring and crystallize under long heat.

Water Circulation.—File feather edge from check valves and seats. Tighten piston only up to waterproof limit. Steam hose prevents collapse and shutting off intake by suction. Hose straps secure smooth joints between hose and pipe. Pump clean water immediately after dirty or bilge water through the engine for at least the same amount of time. Prevent bursting of base or cylinders by using a three-way cock as outlet instead of sea valve.

Bearings.—Inspect bearings often for loose or lost screws, nuts, cotter pins and shims. Test babbit metal with Prussian blue for uneven wear, at least at the end of each season.

Oiling.—Strain oil of fat lumps and dirt to save blocking pipes and pump. Flush pipes, pump and base clean of old oil gum with gasoline. Clean moving parts of old oil with alcohol or kerosene to prevent gum and carbon. Use thin oil sparingly and often rather than thick oil copiously and rarely.

Gasoline.—Strain through chamois of best quality. Accept no "strainer" at a dealer's. Clean sediment from tank line, inboard strainer and carbureter at least once a season.

Electricity.—Use patent terminals and soldered joints. Protect cables in tube large enough for ventilation and motion. Keep gaps in coils, magneto and plugs uniform to reduce the resistance. Clean plugs often, adjust with a standard tester and dry in flame if damp. Stick to a familiar first class plug and avoid freak plugs. Smooth and face contact points for perfect contact. Keep spare platinum points on hand. Screw coils fast to bulkhead to avoid vibration and slipping.

Two-Cycle Engines.—Include the foregoing and add the following. Keep gaskets watertight and gas-tight with shellac. Use smooth heavy hardware paper for gaskets. Gaskets on four-cycle engines require the same cautions. Mix oil with gasoline in definite proportion not by guesswork, for lubrication, but better keep gasoline clean of all other ingredients for better vaporization and adjust oilers. Keep extra springs and moving parts of make and break devices, and replace all loose and worn parts therein.

Whistle Line.—Grind check valve in pump and at tank; file feather edges. Keep tank empty of condensation water. Fill all screw threads with thick shellac. Stop leak in whistle valve. See that pipe is of full size required by the pump.

(*Continued on page 27*)

Very Little Trouble.

My first engine trouble began early this year, the pump being the particular part to cause trouble. When the engine was laid up for the winter, the water was drained from the pipes and jackets, but the packing was left in the pump, which is of the rotary type. The packing being wet, froze and held the pump shaft solid.

During the winter while the pump was in this condition the engine was turned over, with the result that the driving gear on the pump shaft was torn loose and the shaft sprung.

This was not noticed at the time, as the gears are inclosed and only a short piece of the shaft is exposed.

After the boat was launched it was soon discovered that no water was being pumped; at first it was thought the pump needed priming, but when that failed we discovered the pump was not turning.

Several hours were spent in fastening the gear to the pump shaft, but it didn't hold as many minutes. Then a more careful examination showed the shaft was sprung. This had to go into a lathe to be straightened. A light cut was taken off the shaft and the gear bored out and bushed. The pump was then reassembled and caused no more trouble this season. *Moral:* Take the packing out of the pump in the fall, and that is what I will certainly do this year.

The only other engine trouble worth mentioning was the burning of the vibrator points on the coils. It is believed this was caused by running the magneto at too high a speed, the magneto being driven by a friction governor.

The speed has been changed to that advised by the makers, and it is hoped the coil troubles are over. However, next year there will be extra coils wired up and ready for use.

Some may consider this unnecessary, but it would certainly prove convenient in case of trouble with the vibrators and would also be useful in locating other ignition trouble.

With a properly designed and well-built engine there seems to be little that is apt to go wrong if the engine is well lubricated. As this is absolutely necessary, the engine will be taken down this fall and each part inspected. If any place shows unusual wear or lack of oil, this will be noted, and the feed supplying oil to the particular part will be opened more for next year.

While the engine is apart the connecting rod bearings will be taken up if worn. Also the main crankshaft journals if necessary. Then the engine will be reassembled and put in shape for next season.

The reverse gear is believed to be in good condition as it works finely and is well lubricated, but I want to have a look at the thrust bearing as this part is subject to very hard usage.

C. H. Christie, Saginaw, Mich.

Taking Care of Extra Gasoline.

Methods of Storing Fuel Which Cannot Be Taken Care of in the Regular Fixed Tanks. Several Different Methods Suggested Depending Upon the Type of Boat and Amount to Be Carried.

Tanks Placed High Up.

Prize Winning Answer

STORAGE of gasoline for long distance racing or cruising is a serious matter for several reasons. In the first place, liability of leakage of fuel from the temporary supply must be minimized, and provision made to prevent gasoline from entering the bilge in case of such leakage. Again, locker space, valuable at all times, is doubly so while cruising or racing. Floor space is also at a premium in a small or moderate sized cruiser.

The most satisfactory and safest method of storing fuel is in cylindrical tanks which may be used temporarily in two ways, with perfect safety, and occupying no floor space or locker room at all.

The first method for storage is adaptable only to trunk cabin boats having an offset at the sheer line on which tanks may be secured with metal straps fixed to the cabin deck and blocks on covering boards as shown in the illustration. In this case any leakage of gasoline will naturally flow overboard.

On the raised deck type of cruiser, however, it is necessary to place these tanks inside the boat in the same relative position, in which place it should be hung from the deck carbines and ribs by short oak knees or bent ribs bolted in place as illustrated.

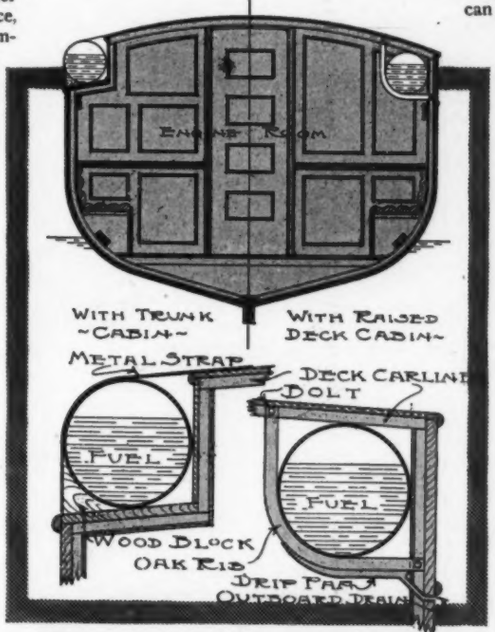
When the tanks are within the boat, possible leakage into the bilge may be prevented by placing drip pans under them and draining these outboard.

Such tanks provide for a convenient storage for gasoline which is at all times in sight and accessible and subject to no undue strain.

The placing of these tanks on either end of the boat's beam causes greater ease of motion in a seaway, a most desirable feature for smaller boats, not designed strictly for rough water.

Because they are properly supported and thus relieved of strain, and because possible leakage is provided for, much lighter temporary tanks may be used with safety.

R. W. HUESTIS,
Springfield, Mass.



Placing the tanks high up, as suggested by Mr. Huestis.

Safety First.

THE carrying of extra gasoline in cans to increase the cruising radius is a dangerous proceeding and is to be avoided if it is at all possible. The tossing and tumbling around it will receive in a forced trip where you must go through any kind of weather will exert a tremendous effort to loosen the fastenings and gasoline running over a boat has been the cause of many fires. Therefore proceed with the "Safety First" motto, and install permanently as many regular tanks as you can. If this cannot be done, the arrangement illustrated here will be a safe, convenient method of carrying extra gas. A framework consisting of two 2 x 4's with crosspieces hollowed out to receive a regular "boiler type" gasoline tank is made to fit crosswise in the cockpit. The 2 x 4's are raised an inch or so from the cockpit floor and are securely held at each end by blocks cut out to fit around them and these blocks securely screwed to the cockpit siding as shown.

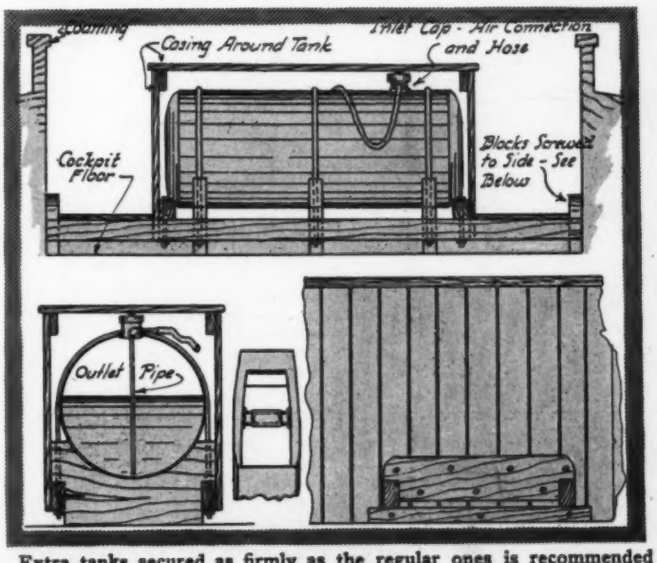
When the tank is not needed, these screws can be taken out and the entire frame and tank removed and stored on shore.

A casing is shown built around the tank which will serve as a table or seat, but this can be omitted.

These can be gotten in most any size and are very heavily built. The regular outlet hole is plugged up. The large inlet nipple is bored and tapped at the side to receive a nipple which is screwed in from the outside. An ell is fitted inside and a pipe run down to about ⅛ in. of the bottom of the tank. The filler cap is tapped out to receive the air connection from a bicycle pump, through a check valve. A hose sufficiently long enough to reach from this tank to the regular tank opening is needed, and the air pressure will force the gas out of the tank to the regular tank.

Another way to get the gasoline out of the tank is to use the regular 2-hose bilge pump—pumping the gasoline into a small can and carrying it to the regular tank.

L. R. KELLEY, Philadelphia, Pa.



Extra tanks secured as firmly as the regular ones is recommended by Mr. Kelley.

Extra Tank Under Cockpit Seat.

IN the average small cruiser of to-day the best place for the gasoline tank is aft. A full tank forward in a heavy sea might make things exceedingly uncomfortable and the bow may always be weighted down if necessary. There is probably no better place aft than under the seats in the cockpit. Here it is, a position to be easily examined, and it is also out in the air where if a leak should occur the gasoline would have a chance to evaporate instead of forming explosive gases in the bilges.

The tank should be cylindrical in form, this shape being naturally the strongest and, should be constructed of a good quality of galvanized iron or steel in preference to copper for the same reason.

The tank should be set in half saddles of oak securely bolted to the floor and held in place by iron bands encircling the tank. When cutting the bands make them a little shorter than necessary in order that they may be shimmed up with washers. Remove enough of these washers to insure a tight fit upon the saddles.

A filling plug and air vent (a small brass petcock) are to be placed on top of the tank in the most convenient place. A shut-off valve will be placed at the outlet of the tank. The piping may be entirely separate from the permanent tank piping or connected to it by a tee joint. Place the piping in a position where it may be easily examined, but where it is least subject to injury.

A tank securely installed in this way cannot shift and cause leaks and there will be no need for any drip pan.

Anson E. Meanor, Jr.

The Pressure System.

When it becomes necessary to carry extra gasoline, the first thought is usually to put it on board in five-gallon cans. The trouble with this is that they take up a great deal of room, and are liable to be tipped over and spilled, as the filler caps are seldom tight.

A better way would be to have a tank built of the required size. It could be either round or square. The square tank holds more for the space required and is very easy to strap in position.

The best place to carry such a tank will depend on the size and arrangement of the boat. Sometimes it could be placed under the after deck or seat, but in most cases it could be strapped to the cockpit floor. Any location accessible for filling will do.

A pressure system would be the simplest and safest way to transfer the contents to the regular tanks, and it would also allow the extra tank to be placed in any position, either above or below the regular tanks.

Drill and tap the filler cap from the under side for ¼ in. pipe. Then have a piece of brass pipe threaded on one end. Screw this into the filler cap and cut the pipe off so the lower end will just clear the bottom of tank. Now you can tap out the end of pipe where it projects through cap, for ⅛ in. pipe size tubing connector; 5/16 copper tubing should be about right for conveying the gasoline to the regular tank.

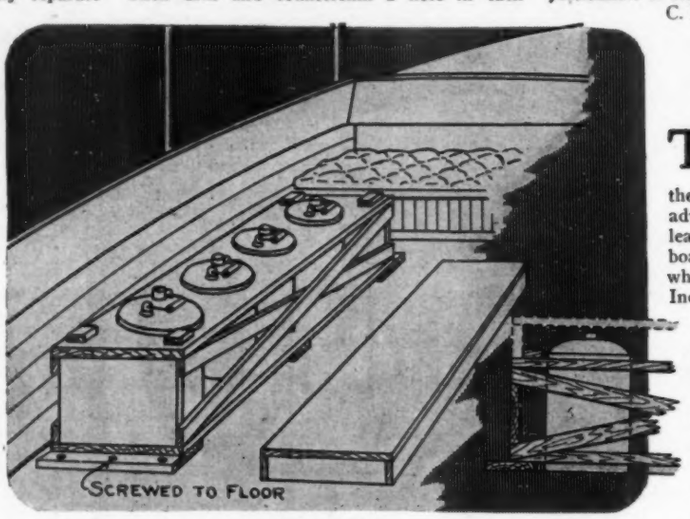
There should also be another small flange on the top of tank, tapped ⅛ pipe size, for an auto tire valve stem. Connect a tire pump to this and pump up a slight pressure in the top of tank. This will force the gasoline through the pipe and tubing into the other tanks. Of course it is necessary to have the other tank perfectly tight and the filler cap should screw down on a gasket to insure this. After the gasoline has been transferred to the regular tank, the tubing can be disconnected and stored out of the way.

A simple, inexpensive way to fasten such a tank to the floor is as follows: Have four small plates about 2 ins. square and 3/16 in. thick, drilled and tapped for 5/16 in. bolt. Then drill and countersink a hole in each corner for a No. 10 or 12 wood screw. Screw these plates to the floor and have four 5/16 in. rods of the required length, threaded on each end. Screw one into each plate.

Two pieces of oak about ⅞ in. x 3 in. with a hole in each end for the studs will make good straps for across the tops of tank. Put these in place and tighten down with nuts.

This will hold the tank secure and is easily removed when the tank is not needed, leaving only the small plates which would not be objectionable if neatly made.

C. H. Christie, Saginaw, Mich.



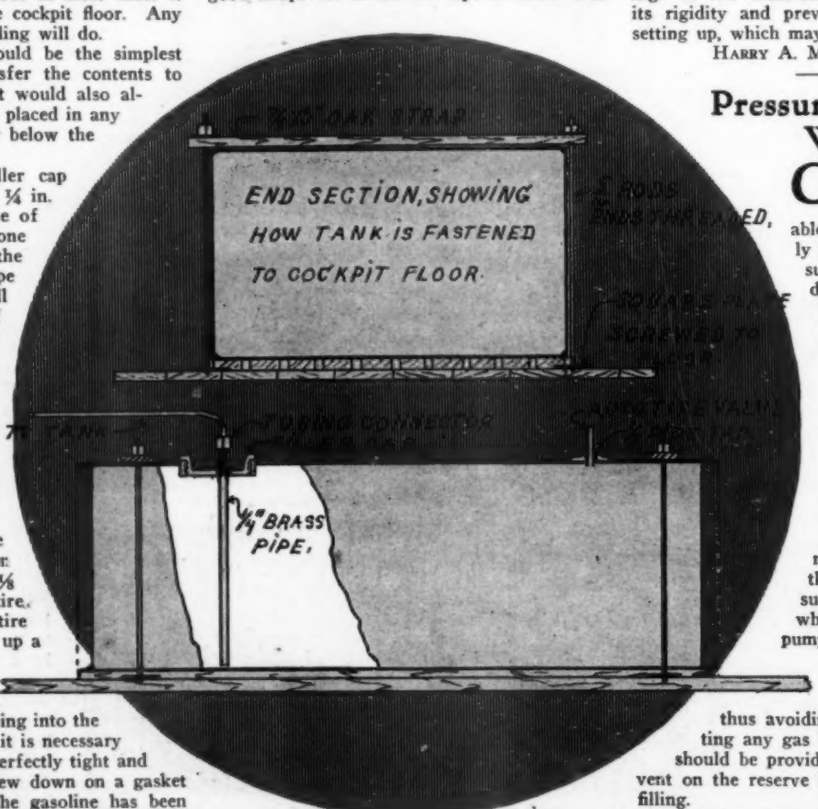
Case to hold five-gallon cans submitted by Mr. Motz.

Placed in the Cockpit.

The most suitable place to store extra gasoline, considering "safety first," is in the open cockpit. Its greatest advantage is that should any leak occur, it will drain overboard, through the scuppers with which most cruisers are equipped. Individual cans of the five- or ten-gallon size are most easily handled. There are cans on the market made of heavy galvanized iron, which are stronger and more preferable than the ordinary can made of tin. These can be stored in racks, as shown in the sketch, the number of cans varying with the available space in the cockpit. If possible, have a rack on each side of the cockpit, containing an equal number of cans, in order to "trim the ship."

The rack is of box-like construction with circular holes in the top and bottom to receive the cans. The battens on the bottom keep it away from the floor and serve as a means of securing it, as indicated in the drawing. A few cross-braces will add greatly to its rigidity and prevent a swinging motion setting up, which may occur in a seaway.

Harry A. Motz, Philadelphia, Pa.



Mr. Christie's design for a rectangular tank.

Pressure from the Whistle Tank.

On an extended cruise or a race, fuel is not always obtainable as readily or as quickly as might be desired. At such times there is a great deal of satisfaction in knowing there is a reserve supply aboard sufficient to finish the trip.

The most conservative of space, safest and most methodical method is to carry the fuel in galvanized tanks fastened under the floor, and deliver it through annealed tubing by air pressure to the main tank or directly to the carbureter. The pressure may be from the whistle tank or a hand pump. The piping could be easily arranged so as to fill the reserve tanks through the main tank, thus avoiding all possibility of getting any gas in the bilge. A shut-off should be provided at each tank and the vent on the reserve kept closed except when filling.

By having the weight low it will serve as ballast and, centrally located, where being least

affected by the motion of the boat, and affecting the trim least, it will cause no inconvenience in rough or smooth water.

If conditions should not warrant the installation, permanent reserve tanks, 5 gallon square oil cans in thin wooden cases will answer. Remove the caps and solder on a more substantial brass cap. These may be stowed under the cockpit floor and securely tied down.

W. B. MOSES, Newburgh, N. Y.

Based on Real Experience.

(*Continued from page 24*)

Clutch and Shaft.—Keep the drum at least half full of first class grease. Correct the slightest rattle of loose or friction of dry parts. See that reverse strap clears the drum in "go-ahead" position, but binds hard before the reverse bar is back as far as deck or cabin installation thereof will permit. In other words, leave a reserve for pressure with the bar upon the drum by the strap. See that inboard stuffing box is tight, just enough to stop leak and not enough to heat the shaft by friction. See that outboard bearing is not worn so that shaft vibrates in it. If of the type lubricated with grease use thin grease, which under pressure quickly feeds into the entire length of the bearing and keeps out the water. Clean base of engine under clutch of old grease which frequently collects sand and other dangerous material. Tighten set screws and cap screws or bolts in couplings.

Magneto, Dynamo and Batteries.—Oil sparingly with thin oil. Clean commutator with fine emory cloth. Adjust contacts of magneto to uniform gaps and springs of brushes to equal pressure. Provide smooth contact surfaces for brushes. See that all connections are tight and where possible soldered. Clean leather of friction pulley and face of flywheel of grease or oil with gasoline. Adjust governor springs to equal value and firm contact between the friction pulley and the flywheel. Keep gear box full of first class half hard grease. Do not charge battery with every electrical trouble. Test with an ammeter for dry cells and volt meter for storage batteries, and if nearly up to standard look elsewhere for trouble before discarding batteries.

OILER, N. Y. C.

The Best Type of Stern.

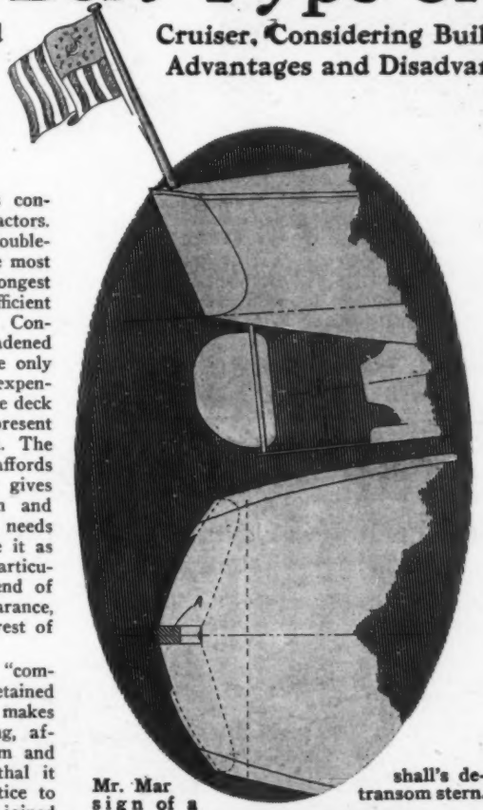
Details for a Medium Sized Cruiser, Considering Building, Strength and Resistance. A Comparison of the Advantages and Disadvantages of the Modern Types.

Advantages of the Rounded Transom.

(The Prize Winning Answer.)

THE design of the stern and its construction are most important factors. There is no question but that the double-ender or boat with a canoe stern is the most seaworthy as well as one of the strongest forms of structure. But it has not sufficient breadth of bearing to get the best speed. Consequently the "compromise" stern—a broadened canoe stern—has come into favor. The only things against this type are, first, it is expensive to build, and second, it diminishes the deck room and storage space aft which are present in a boat with a straight transom stern. The latter is less expensive, has the bearings, affords opportunity for clean, fast lines, and gives the maximum amount of deck room and storage space. On the other hand, it needs a good deal of reinforcement to make it as strong as the rest of the hull, is not particularly handsome and often gives the end of the boat a box-like or sawed-off appearance, especially if it is varnished when the rest of the hull is painted.

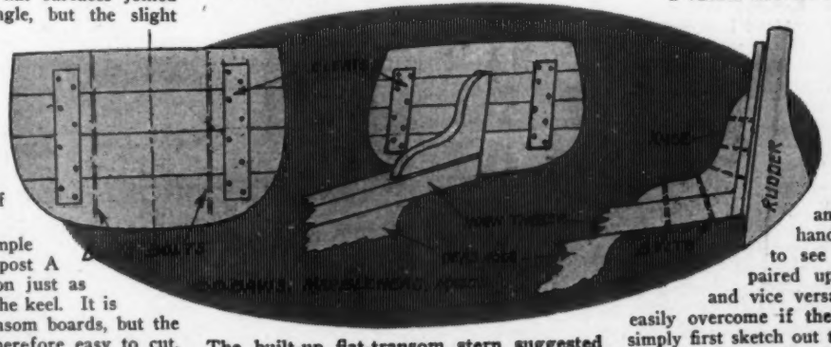
Most of the advantages of both the "compromise" and the transom stern are retained in the stern herewith illustrated. It makes a good seaboat, has plenty of bearing, affords clean lines, plenty of deck room and storage space, is inexpensive and withal it looks well. It is quite common practice to make a stern with two flat surfaces joined in the center at an angle, but the slight trouble of curving these surfaces as shown in the accompanying cut is well worth while, as it relieves the otherwise stiff appearance and harmonizes with the other curved surfaces of the hull.



Mr. Marshall's design of a transom stern.

The construction is simple and strong. The stern post A is fastened to the keelson just as the stem is fastened to the keel. It is rabbeted to take the transom boards, but the rabbet is straight and therefore easy to cut. The transom boards need not be thick, but should be heavily reinforced all around, their edges to make good fastening for the planking and decks. One or two good knees between the stern post and the keelson will make an absolutely rigid connection. The stern post should be carried through the back as shown, as it is otherwise difficult to make a watertight joint between the two transom boards.

E. W. MARSHALL, Yonkers, N. Y.



The built-up flat-transom stern suggested by Mr. Davis.

The Flat Transom Stern.

A STRONG, comparatively easy stern to build is that known as the flat transom. When given a slight rake aft it makes a good appearance on almost any type of motorboat.

This type of stern, besides being the easiest to build, gives good deck room aft, does not pound, steers well, and an outboard rudder can be very easily and efficiently attached to it.

Two or more pieces of oak or mahogany at least one inch thick are fitted edge to edge and bolted through and through with blind bolts. Cleats are screwed to the inside as shown. The whole is then erected and secured to the horn timber or deadwood by a stout knee and bolted to same. The planking is nailed or screwed to the stern, and ends sawed off and smoothed flush. If desired, a strip of brass plate can be fitted around the edge, covering the ends and corners to protect them from injury. Some prefer to cut a rabbet and let the ends of the plank into this, but that is not the usual practice.

It is very important, for looks sake, if nothing else, that the shape of the stern should harmonize with the shape of the bow. Nothing spoils the general appearance of an otherwise handsome craft more than to see a finely shaped bow paired up with an ugly stern and vice versa. This fault will be easily overcome if the amateur builder will simply first sketch out the profile of his boat.

C. D. DAVIS, Marblehead, Mass.

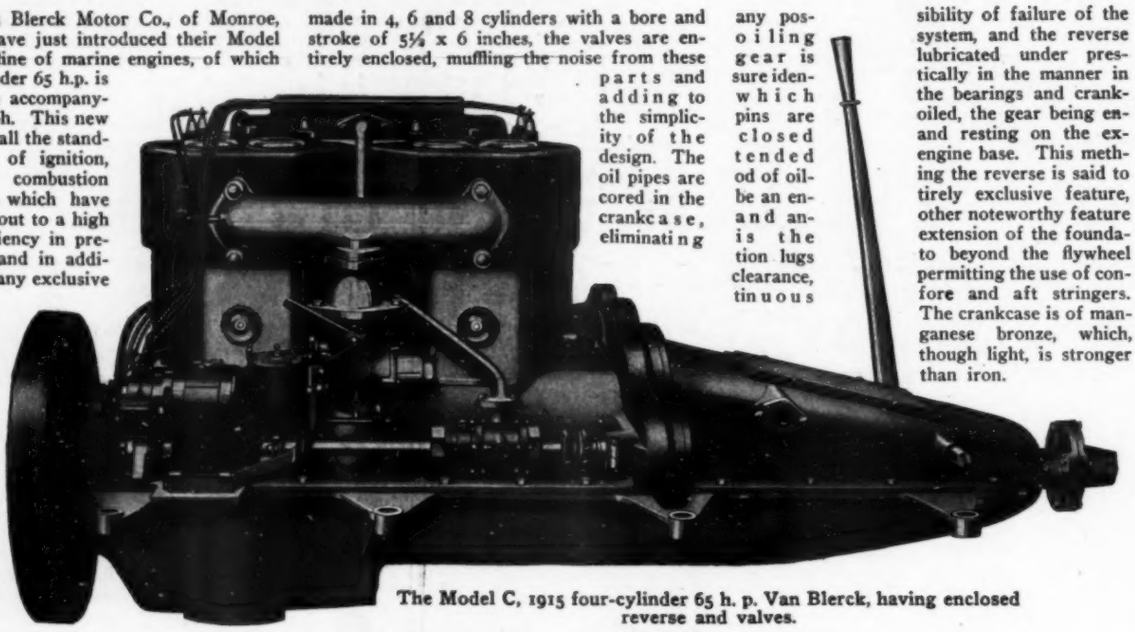
MARINE MOTORS

The Model C Van Blercks.

Having Many New and Important Features Made Possible Through Specialization on One Type. Valves Enclosed, Reverse Gear Lubricated by Pressure Feed, Bronze Crankcase, etc.

THE Van Blerck Motor Co., of Monroe, Mich., have just introduced their Model E, 1915 line of marine engines, of which the four-cylinder 65 h.p. is shown in the accompanying photograph. This new series retains all the standard features of ignition, carburetion, combustion and exhaust which have been worked out to a high point of efficiency in previous years, and in addition boasts many exclusive features which, it is said, have been made possible through increased production and specialization on one type.

In the new models, which as in the Model C which they replace, are made in 4, 6 and 8 cylinders with a bore and stroke of 5¼ x 6 inches, the valves are entirely enclosed, muffling the noise from these parts and adding to the simplicity of the design. The oil pipes are cored in the crankcase, eliminating any possibility of failure of the oiling system, and the reverse gear is lubricated under pressure feed, the gear being entirely enclosed and resting in the oil-filled base. This method of oiling the reverse is said to be an exclusive feature, and is the extension of the foundation lugs to beyond the flywheel clearance, permitting the use of continuous fore and aft stringers. The crankcase is of manganese bronze, which, though light, is stronger than iron.



The Model C, 1915 four-cylinder 65 h. p. Van Blerck, having enclosed reverse and valves.

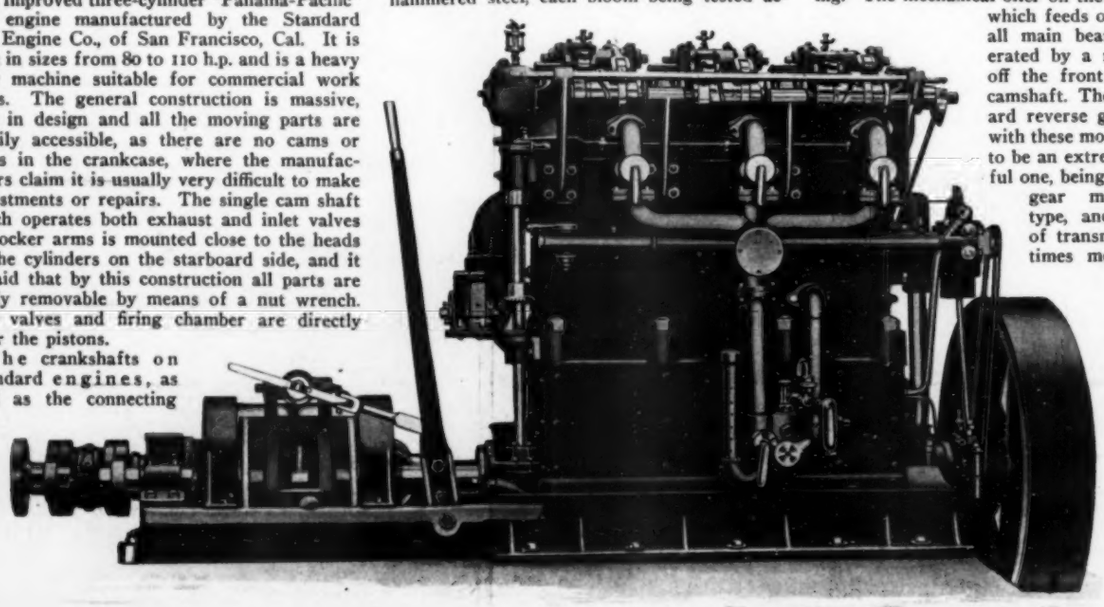
The "Panama-Pacific" Model.

Many Refinements and Improvements Noticeable in 1915 Line of Western Standard Motors. Massive in General Construction, Neat in Design, and Accessible As to Moving Parts.

THE accompanying illustration shows the improved three-cylinder "Panama-Pacific" engine manufactured by the Standard Gas Engine Co., of San Francisco, Cal. It is built in sizes from 80 to 110 h.p. and is a heavy duty machine suitable for commercial work boats. The general construction is massive, neat in design and all the moving parts are readily accessible, as there are no cams or gears in the crankcase, where the manufacturers claim it is usually very difficult to make adjustments or repairs. The single cam shaft which operates both exhaust and inlet valves by rocker arms is mounted close to the heads of the cylinders on the starboard side, and it is said that by this construction all parts are easily removable by means of a nut wrench. The valves and firing chamber are directly over the pistons.

The crankshafts on Standard engines, as well as the connecting rods, are forged from solid billets of the best hammered steel, each bloom being tested according to Lloyd's Register for marine shafting. The mechanical oiler on the 1915 models which feeds oil directly to all main bearings is operated by a rod working off the front end of the camshaft. The new Standard reverse gear supplied with these models is stated to be an extremely powerful one, being of the bevel gear multiple disc type, and is capable of transmitting many times more power than the engine is rated to develop.

One side of the crankcase is perforated with small holes, and the air is drawn into the carburetor through the base.



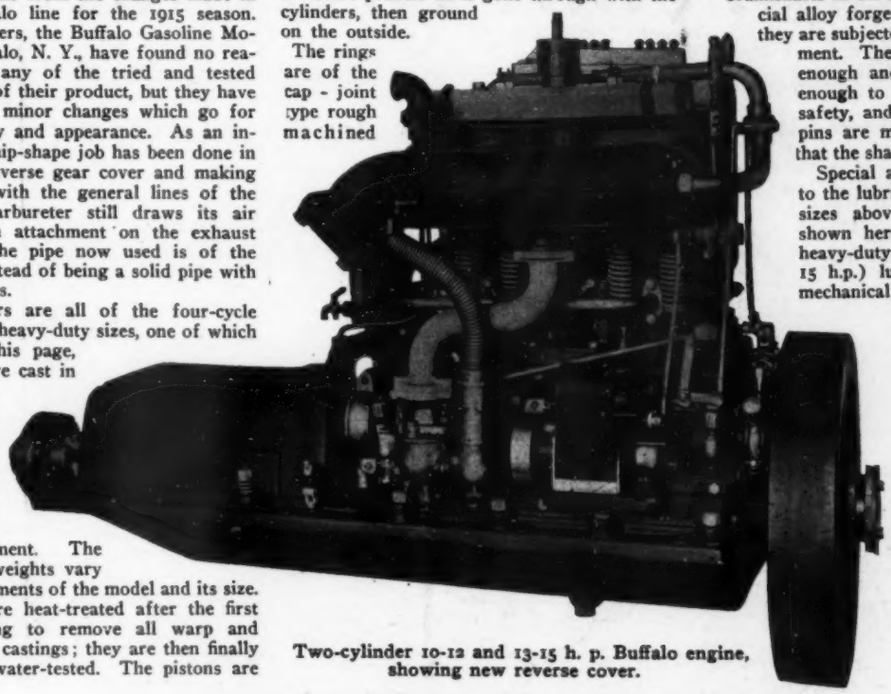
The three-cylinder type of San Francisco Standard engines built in sizes from 80 to 110 h. p.

The Heavy-Duty Buffalos.

Two-Cylinder Four-Cycle Motors Built in Two Sizes for Use in Small Work Boats and Cruisers. Having Numerous Small Refinements of Detail But No Radical Changes for 1915 Line.

BETTER working and better looking engines result from the changes made in the Buffalo line for the 1915 season. The manufacturers, the Buffalo Gasoline Motor Co., of Buffalo, N. Y., have found no reason to discard any of the tried and tested major features of their product, but they have effected several minor changes which go for greater efficiency and appearance. As an instance, a very ship-shape job has been done in flattening the reverse gear cover and making it fit in more with the general lines of the motor. The carbureter still draws its air heated from an attachment on the exhaust manifold, but the pipe now used is of the flexible type, instead of being a solid pipe with rigid connections.

Buffalo motors are all of the four-cycle type, and in the heavy-duty sizes, one of which is shown on this page, the cylinders are cast in pairs. They are made from close-grained gray iron, thoroughly water-jacketed, with large hand hole plates for cleaning out sediment. The thickness and weights vary with the requirements of the model and its size. All cylinders are heat-treated after the first rough machining to remove all warp and strain from the castings; they are then finally machined and water-tested. The pistons are also gray iron castings, rough machined by the same process as is gone through with the cylinders, then ground on the outside. The rings are of the cap-joint type rough machined inside and outside, then ground to fit.



Two-cylinder 10-12 and 13-15 h. p. Buffalo engine, showing new reverse cover.

Crankshafts in all sizes are made of a special alloy forged steel. Before turning they are subjected to a special heat treatment. The bearings are made long enough and the shafts are strong enough to allow a large factor of safety, and all bearings and crank pins are machined true to size so that the shafts are interchangeable.

Special attention has been given to the lubricating system and in all sizes above 10 h.p. (the engine shown herewith is a two-cylinder heavy-duty model built in 12 and 15 h.p.) lubrication is effected by mechanical valveless oilers, gear driven. The oiler is placed on the port side of the engine and while one pump lifts the oil from the reservoir and forces it through the sight glass, a second pump takes it up and drives it directly on to the bearings. The oil is drawn from the base back to the oiler, to be used again and again.

These two-cylinder models are designed for small boats which call for slow speed, reliability, economy and safety.

The Johnson Racing Motors.

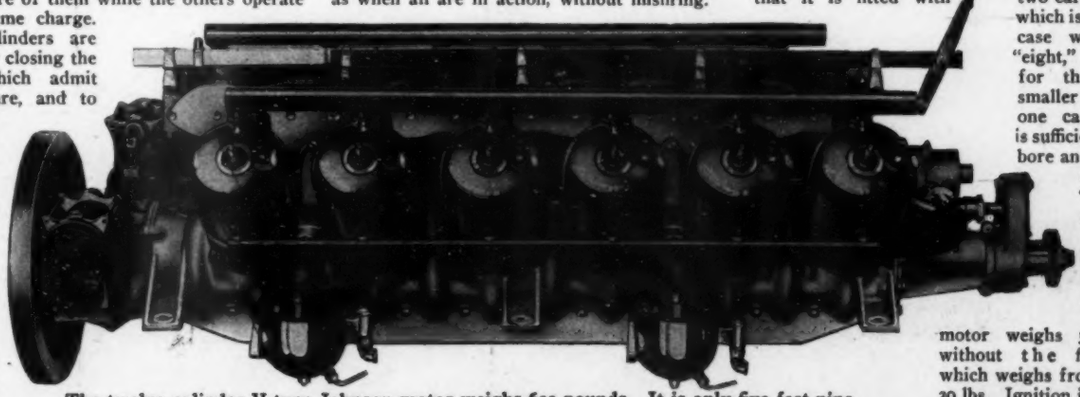
Of the V-Type, Built in Four, Six, Eight and Twelve Cylinders, and Working on New Principle. Rigidity and Freedom from Vibration Claimed—Original Method of Throttle Control.

THE Johnson speed motors are made by the Johnson Brothers Motor Co., of Terre Haute, Ind., after a design which differs very essentially from other marine motors. The motors are of the V-type, and they are claimed by the unique features of their design to retain the advantages of power obtained from the two-cycle principle and combine the reliability of the four-cycle. The V-type is selected to lessen the length of the engine, reduce the weight and increase the rigidity of the crankcase.

In throttling down the Johnson motors the fuel is not cut off in a graduated amount from all cylinders alike, but is shut off entirely from one or more of them while the others operate on the same charge. These cylinders are cut out by closing the valves which admit the mixture, and to bring the engine up to its former speed it is necessary only to release the mechanism which holds shut these check valves. It is said that the speed will be resumed without a miss, and this perfect action of the new control system is ascribed to the new intake manifold employed, by which the gas entering from the carbureter is distributed equally to each cylinder by a special system of inlets varying on each type. There is no passage between the carbureter and cylinders in which the gas has opportunity to stop and condense, thereby causing a variation in the mixture. This system of control is considered to result in many other excellent features, two of which are great economy because the mixture is always perfect, and less vibration because the cylinders in action are working as perfectly as when all are in action, without misfiring.

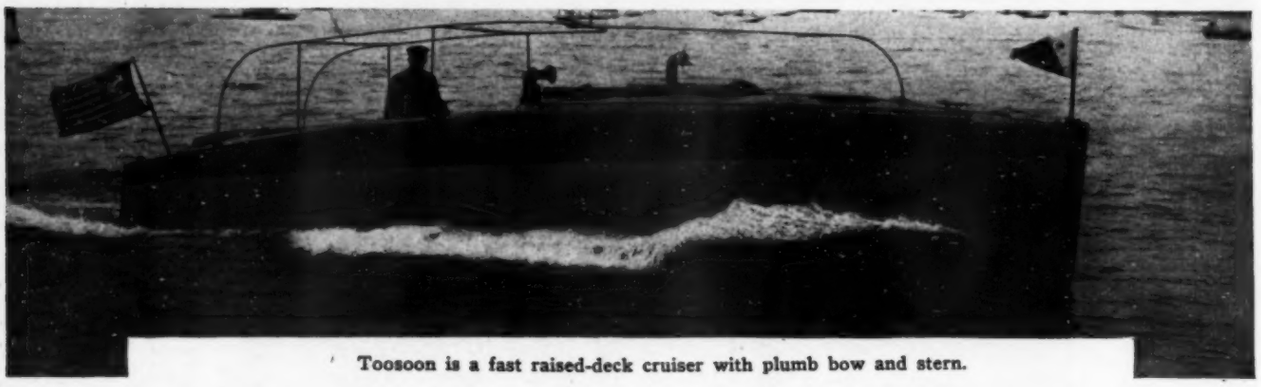
Substantiality and strength are fully as important as light weight and great power, and any reduction of strength and durability has been avoided in these engines by the use of the very best materials for the different parts. The crankshaft is of Krupp's chrome nickel steel, heat treated and ground, the cylinders are of gray iron with polished cast aluminum jackets pressed on, and the crankcase is a one-piece casting which is very rigid.

These motors are made in four sizes: 4-cylinder 50-60 h.p., 6-cylinder 75-90 h.p., 8-cylinder 100-120 h.p., and 12-cylinder 150-180 h.p. The 12-cylinder machine is shown herewith. It will be noted that it is fitted with two carbureters which is also the case with the "eight," while for the two smaller sizes one carbureter is sufficient. The bore and stroke of the "twelve" measure 5-inch bore by 4-inch stroke. The motor weighs 590 lbs. without the flywheel, which weighs from 20 to 30 lbs. Ignition is of the Bosch HL type.



The twelve-cylinder V-type Johnson motor weighs 620 pounds. It is only five feet nine inches in length.

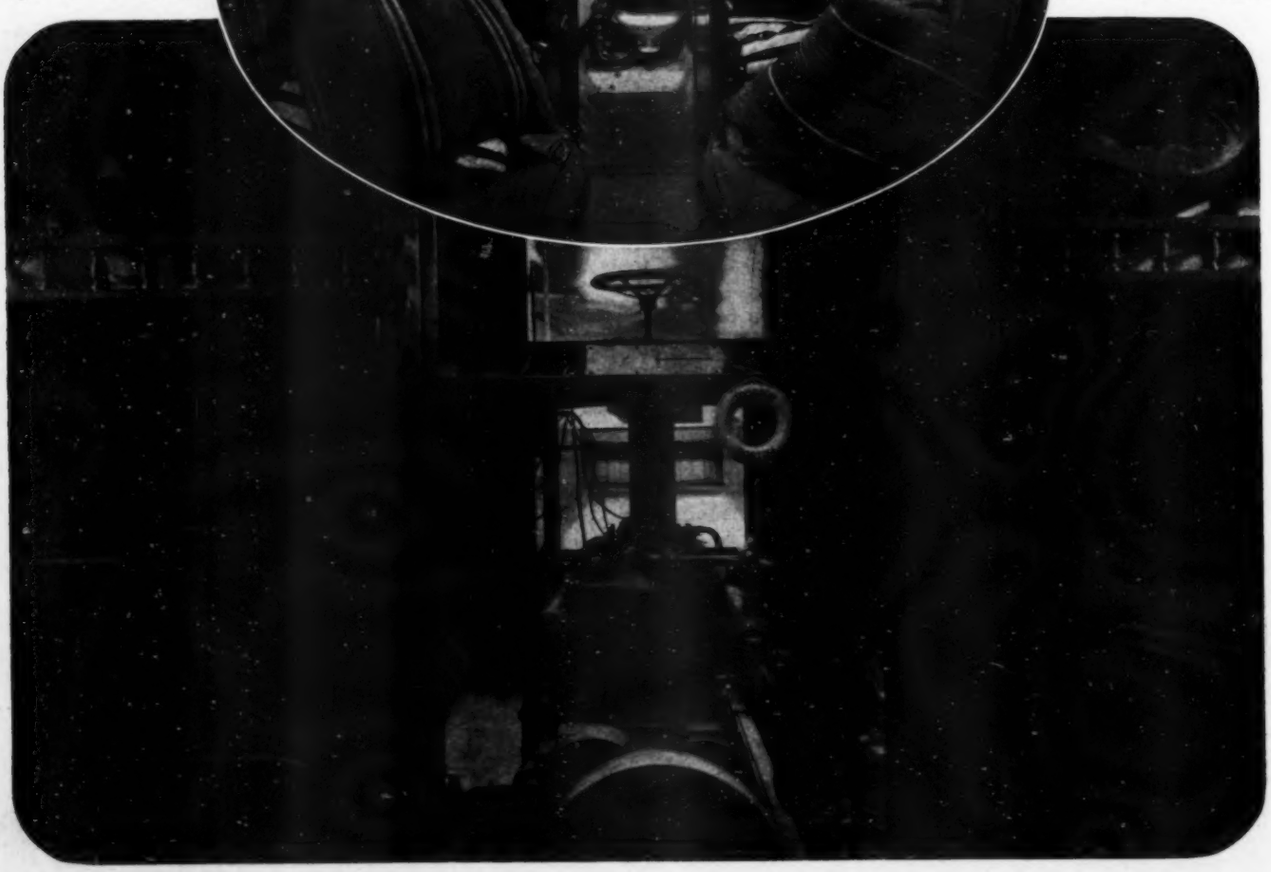
A Bostonian's Express Cruiser



Toosoon is a fast raised-deck cruiser with plumb bow and stern.

TOOSOON is an interesting express cruiser built after plans by John F. Small by James E. Graves, of Marblehead, Mass., for Mr. Richard Hutchison, of Boston. She is of the raised-deck type with plumb bow and stern, measuring 35 feet in length by 6 feet beam and 2 feet 6 inches draft. She is powered with a 6-cylinder 4¼ in. x 5½ in. Loew-Victor engine.

In the bottom picture on this page the eye will be attracted by a spring balance, set in a rack over the engine. This balance was used in an interesting test made by Mr. Hutchison to determine the best towing position for Toosoon's tender. It was discovered that with the tender bow first a force of 60 pounds was required to tow it, while with the dink reversed, the towing strain indicated was only 30 pounds. Which will enlighten any of you who have seen Toosoon under way, stern to stern with her tender.



Photographs by N. L. Stebbins.

The upper picture shows the cabin, looking forward, and the lower, the engine-room, in which is installed a Loew-Victor engine.

From MOTOR BOATING Readers

MoToR BoatinG's columns are open to its readers, not only for asking questions, but for placing before other readers ideas, results of experience, opinions, etc., that should be interesting or helpful to them; but the editor will not, of course, be responsible for any opinions expressed or statements made in such communications. The name and address of the writer must necessarily be given in every case and return postage enclosed to make an answer by mail possible (no anonymous contributions will be considered for publication), but names will be omitted in publishing the letters and answers where desired. Through the correspondence department readers of the magazine may be of direct aid to one another in solving the problems of motor boating.

Putting Canvas on a Deck.

To the Editor of MoToR BoatinG, *Sir:*

As I have in the past obtained much help from the perusal of your "Trouble Department," I take the liberty of asking you a few questions.

(1) What is considered the best method of putting on a canvas deck? Is the canvas shrunk before or after laying, and how is this done?

(2) When I use a long shank plug, my motor, one-cylinder, seems to shake, excessively, and I experience some trouble with an occasional knock, which, I presume, is a premature explosion. Should this be the case?

(3) My motor usually turns over very freely, and the alignment is perfect, but sometimes it seems that when I rock it against compression to start it, it binds so that I can hardly turn it. The contact rotating bar in the timer is large. Could this binding be caused by dirt or gummed oil being worked in between the bar and the bottom of timer case? It hardly seems that this could cause so much resistance, but I could find no other possibility, unless the timer shaft itself binds.

W. K. B., Ann Arbor, Mich.

[In regard to putting canvas on the deck of a motor boat, there are several ways of doing this, but we think you will find the following very satisfactory:

In the first place, the deck to be covered should be properly laid and fastened, and the very common mistake of leaving it rough and unfair "because it will all be covered up" should be avoided. Neither should matched stuff be used having beading on the upper side, as well as underneath, as this beading always shows through the canvas in the form of parallel stripes, completely spoiling the appearance of the deck. The planks should be laid with close seams on top, planed off fair and then sanded down with coarse sandpaper. This gives a surface that can be successfully covered without showing wrinkles, slack places or ridges.

Choose canvas of a width sufficient to cover the deck in one piece with enough left over to turn down around the edges. Eight-ounce duck is the best weight for average work. Draw a center line down the middle of the piece and it will assist you in stretching it evenly over the surface. Copper tacks should be used for fastening the canvas round the deck edges and openings for hatches, skylights, etc. Do not cut out for deck openings until the canvas is on and fastened, as the holes will tend to make the canvas draw unevenly and wrinkle.

The usual method of fastening the canvas to the deck is to paint the surface to be covered thickly with "all the old paint in the shop," mixed together to about the consistency of molasses; then to stretch and tack the canvas down very smoothly and tightly at close intervals with copper tacks, keeping the center line on the canvas over the center line of the deck. It should then be rubbed down hard all over to insure a perfect contact, and when dry, if the job has been well done, it will lie smooth and present a neat and shipshape appearance. Jeffery's marine glue No. 7 is sometimes specified for this purpose, and is applied to the deck hot with a brush, and when the canvas is stretched and tacked in place it is ironed down with a hot flatiron to cause the glue to sweat through the covering. Varnish is also used as an adhesive by many boatmen and seems to work well, though no better than the other mediums mentioned.

Painting the canvas is an important part of the process since it is the paint that renders the deck waterproof and perfect waterproof qualities are the crowning glory of a canvas-covered deck. The old sailor will tell you that the canvas-covered deck will never crack if it is wet with sea water before applying the first coat of paint. And this first coat of paint, by the way, should be largely linseed oil with little lead. Other coats may be made up with less oil (for it will take four or five coats to fill the canvas properly), and a final color that is usually satisfactory is a certain "tan" color that was popularized by the vessels of our navy upon stacks, masts and superstructures in the days before they wore their "war paint" every day.

Half-round oak mouldings should be sprung around the sheer of the boat or the edge of the cabin top to cover the tack heads and the raw edges of the canvas, and these should be fastened with brass screws counterbored and plugged, since iron fastenings will streak the boat's paint with rust every time it rains or the decks are washed down

A canvased deck properly laid and covered is neat in appearance, easily kept in condition, and is what many "calked and payed" decks are not—absolutely watertight. It is also inexpensive and its construction is easily within the ability of the average amateur.

In regard to using a long shank plug, probably this allows your mixture to ignite sooner and quicker than a short plug does, and the only remedy we know of to prevent the knock is to retard your spark somewhat, which, in reality, will make the explosion come at the same time as it would with a short plug and a more advanced spark.

In regard to your motor sticking at times, this happens very often with some one-cylinder motors, especially that kind which has an offset cylinder. It is not due to binding of the timer's stem, but simply friction between the piston rings and cylinder walls. The remedy for this, when it occurs, is to add a little lubricating oil through the petcocks into the cylinder and work the motor a few times by hand, and it should then turn over easily. If this does not remedy it, try a little greasing, followed up by lubricating oil, or even an application of denatured alcohol. This latter is a very good agent for removing carbon; if any of this latter has worked in beside the piston rings, it should loosen them up.

A Gasoline-Electric Boat.

To the Editor of MoToR BoatinG, *Sir:*

I intend to build a V-transom cruiser, with a length of 50 ft., beam 10 ft., draft 34 in.; displacement, without motor, about two tons. The plans call for a 50 to 60 horsepower motor, weighing not over 1,250 lbs., to drive her at a speed of 14 miles per hour.

My idea is this: I want a gas-electric boat, which is driven by electricity, generated by its own power plant. The current is to be developed by a gasoline motor driving a dynamo supplying current which, in turn, drives an electric motor. I think because of slight loss of efficiency in electrical transmission, and also on account of the constant direct pull of the electric motor, it is possible for a boat to perform its functions on much less horsepower than is required by the usual type of motor boat.

What gas-electric plant would be required in the above boat?

Please let me know how I can figure out the electric horsepower to drive a boat?

Also what is the average horsepower ratio between gasoline and electric motors to drive boats at the same speed?

F. A., N. Y. C.

[We are afraid you are designing this boat entirely too light to give you the necessary strength for ordinary use. A 50-footer with a beam of 10 feet should have a displacement of not less than 10 tons. A motor of from 50 to 60 h.p., weighing not over 1,250 pounds would also be entirely too light for this purpose. You should choose one weighing not less than 2,500 pounds, and preferably more.

We do not believe your plan of having a combination gasoline-electric boat is at all feasible. A combined plant of this kind is very inefficient, and you cannot expect to get more than 50% of the power delivered by the gasoline engine to the electric motor. As gasoline motors are built today, there are very few objectionable features to them as regards their use for propelling a boat of the size planned by you. In other words, to employ an electric motor of 50 h.p. to drive your boat, you would require a gasoline engine of nearly twice that power to drive the generator to supply current to the motor, or else you would have to have a very expensive heavy installation of storage batteries with a smaller gasoline motor, in which case you would have to run your charging plant almost constantly in order to get the necessary amount of energy to run the electric motor. Plants of this kind have been experimented with and have always been discarded as impractical, except in very special cases, where the nature of the work may be desirable to have the boat driven at a slow speed by an electric motor.]

Fabius, owned by W. E. Thomas who is at the wheel, winner of a number of races on the Hudson this year. She was designed by Cox & Stevens and is powered with a Lamb motor.

Handicapping Boats in a Race.

To the Editor of MoToR BoatinG, *Sir:*

I have a launch, 25 ft. x 7 ft. with 18 in. draft, and 8 h.p. engine. What handicap should I have against a boat 18 x 5 x 12 in. draft, with 6 h.p.? I would like to have a general rule for figuring this out.

I saw, two years ago, a flat-bottomed boat in Madison Square Garden, N. Y., about 18 ft. x 4 ft. 6 in., with a tunnel at stern in which propeller is situated, being used for river work, where only a few inches, probably 3 or 4, draft is required, and is used by explorers in shallow waters. This boat carried 4 h.p. and was about 18 in. in depth from top of gunwale to bottom. Can you advise me where I can get a design or sketch of this boat?

S. A., Alberta, Canada.

[From the information you have given us, it is absolutely impossible to determine the handicap which one boat should have over the other for several reasons. In the first place, you have only given us the manufacturer's rating of the motor, without its bore and stroke or number of cylinders, and, as you probably know, the actual horsepower delivered by any motor may vary considerably from that claimed by the manufacturer. Also, the extreme draft has little to do with its speed, as some very lightly constructed boats are built with excessive draft, where other very heavy boats are built to run in shallow water, and, therefore, have very little draft.

There is only one standard method of handicapping boats used in this country at the present time, and that is according to the rating rules of the American Power Boat Association. In using these rules it is first necessary to determine the rating of each boat taking part in the race, and this is done according to the following formula:

$$\text{Rating} = 18\sqrt[3]{\frac{LWL \times H.P.}{M.S.}}$$

Where LWL = the length of the load waterline, measured in a straight line between the points farthest forward and farthest aft, where the hull is intersected by the surface of the water, when the boat is afloat in smooth water in racing trim, with crew on board.

H.P. = the horsepower of the motor figured as follows:

For 2-cycle motors, H.P. $= a \times n \times s$, and for 4-cycle motors, H.P. $= \frac{1}{2}a \times n \times s$. Where a equals the area of one piston in square inches, n, the number of pistons receiving direct explosion, s equals the length of the stroke in feet.

$M.S.$ equals the area of the midships section and is obtained as follows:

When a boat is in the same trim as when measuring the load waterline length, take the beam (b) of the boat at the surface of the water at a point 55% from the forward end of the load waterline. Divide b into 5 equal parts or stations, and at the first inboard station from either end, measure perpendicularly down from the surface of the water to under side of the boat's planking, calling this depth, c. Then c, expressed in fractions of a foot, multiplied by b, expressed in feet and fractions thereof, will give the area of the midship section, $M.S.$

The rating of a boat, found and described above, is proportional to the speed which she should go through the water, or, in other words, a boat's rating divided by 4⅓ gives her theoretical speed in nautical miles per hour. By obtaining the rating and then the theoretical speed for each of the boats in the race you will see the proper handicap may be worked out for each boat. A speed in nautical miles an hour for each boat will have to be reduced to the time required for each particular boat to travel one nautical mile at its theoretical speed, and this is done by dividing 3,600 by the boat's theoretical speed in miles per hour, which will give the exact time that it should take her to go one nautical mile. Then, by taking the difference in times per nautical miles for the various boats, the result will be the handicaps per mile, and multiplying these by the length of the course in nautical miles, the total handicap for each boat can be obtained.

For example, suppose we have two boats, whose ratings have been determined as described above to be 41.67 and 50.00, respectively. By dividing each of these ratings by 4⅓, we find that the theoretical speed of the former is 10 miles per hour, and the latter 12 nautical miles per hour. Dividing 3,600 by 10 gives 360, which is the time in seconds it should take the first boat to cover one mile of the course. In a similar way, dividing 3,600 by 12 will give 300 as the time required for the faster of the two boats to cover one mile. Thus the latter boat should cover a mile 60 seconds faster than the former, and should allow her 60 seconds handicap per mile. Should the length of the course be 10 miles, then, of course, this boat would have 600 seconds, or 10 minutes' handicap over the faster boat. Should she defeat her over 10 minutes' actual time, then the faster boat would be the winner of the race, but should she reach the finish line less than 10 minutes ahead of the slower boat, then the latter craft would be the winner.

The shallow draft boat which you make reference to in your letter is probably known as a Rift Climber, and is built by the Rift Climber Boat Co., Athens, Pa.]

Choking of Exhaust Line.

To the Editor of MoToR BoatinG, *Sir:*

I have a 5 h.p. engine in my boat which causes me a lot of trouble by choking the exhaust with the substance enclosed.

Will you please inform me of the cause and how to prevent the trouble?

A. K., Stone Harbor, N. J.

[While we have not made a chemical examination of the substance which you sent us, we really believe that the same is nothing other than mud and salt which has become baked in your exhaust. Probably you are accustomed to having your boat considerably in shallow or muddy water, either under way or while she is anchored. Your circulating pump evidently takes up considerable of this muddy water, which is pumped around the jacket, part of which goes into your exhaust line, provided, of course, that this is water-cooled. In regard to this latter point, you have given us no information in your letter.

Our suggestions for the remedy, if you must continue to run your boat in this muddy water, or where the water is not deep enough to allow clean water to reach your pump, would be to allow either more or less exhaust water to flow into your exhaust line. We are of the opinion that you are now allowing only a small amount of this water to enter the exhaust line, which is turned into steam when it comes into contact with the hot exhaust pipe. As the solid substance in the water cannot be turned into steam, it is, therefore, deposited in the form of mud on the sides of the line, and as more is deposited it continues to be baked on by the heat of the line. If you allow more water to flow into the exhaust line, the heat will not be sufficient to turn the water into steam, and, consequently, there will be no deposits and the line will be kept continually washed out.]

Two and Four-Cycle Motors.

To the Editor of MoToR BoatinG, *Sir:*

On a practical average, what percentage increase of horsepower is derived from a two-cycle engine over a four-cycle of the same bore and stroke?

How is the A. L. A. M. formula figured?

What is a practical way to figure formula of four- and two-cycle engines.

H. W. R., Bordentown, N. J.

[With the same bore and stroke, if the revolutions are the same and both motors are of good design, then the 2-cycle motor should deliver from 15% to 40% more horsepower than the 4-cycle engine does.

The A. L. A. M. (or S. A. E.) formula for determining horsepower is as follows:

$$\text{H.P.} = \frac{D^2N}{2.5}$$, *where* D equals the bore in inches and N the number of cylinders.

A very good formula for determining horsepower of marine motors is as follows:

For 4-cycle motors, $\text{H.P.} = \frac{D^2SNR}{13{,}000}$; for 2-cycle motors, $\text{H.P.} = \frac{D^2SNR}{10{,}000}$, where D equals the bore in inches; S, the stroke in inches; N, the number of cylinders, and R, the revolutions per minute.]

Speed of a Hydroplane.

To the Editor of MoToR BoatinG, *Sir:*

Will you kindly inform me if there is any reliable formula by which the speed of a single step hydroplane can be predetermined with any degree of accuracy? The particular case I have in mind is a 20' x 7' hull, 180 h.p. motor, outfit complete weighing 2,300 lbs.

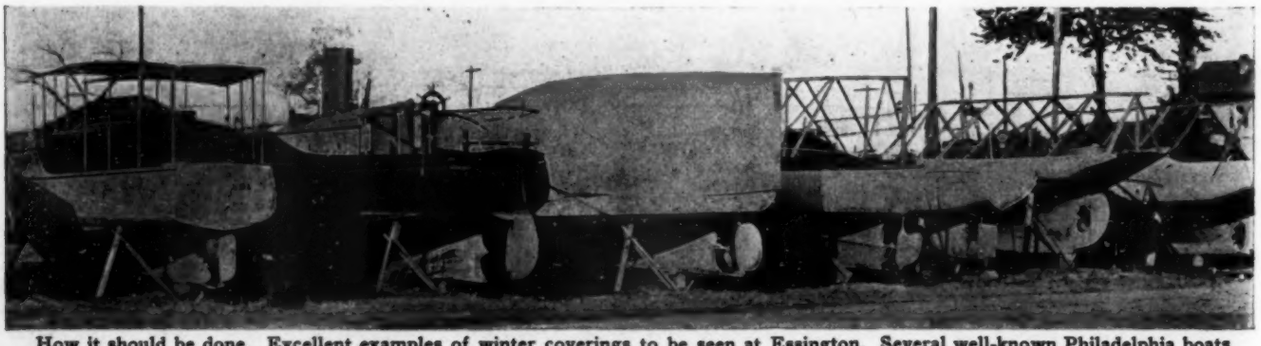
A. G., Detroit, Mich.

[While no formula can be relied upon absolutely to give the speed of the modern hydroplane, as so much depends upon the detail of the design, yet the best formula which we know of to determine the theoretical speed is the one recently devised by Mr. Linton Hope. This is as follows:

$$V = \sqrt[2.3]{\frac{10{,}000 \times P(L+B)^{.65}}{W}}$$

Where V = speed in knots
P = power of motor
L = length of boat
B = width of step at waterline
W = weight of boat.

In your case, with a 180 h.p. motor and a 20' x 7' single-step hydroplane, having a total weight of 2,300 lbs., the speed, according to the above formula, would be 46.8 knots, which is equivalent to 53.7 miles an hour. The results seem to be very consistent, as the specifications which you have given us conform closely to those of the fastest 20-footers of to-day. In fact, the fastest average speed which any boat has made this year, with and against the current, is 53.55 miles per hour, which is only .15 mile different than the figure given by the formula.]



How it should be done. Excellent examples of winter coverings to be seen at Essington. Several well-known Philadelphia boats will be seen in winter quarters.

AMONG · THE · CLUBS

Ocean City Yacht Club, Charmian in the foreground.

Panama-Pacific Regatta.

At the request of a number of yacht clubs, the management of the Panama-Pacific International Exposition has agreed to postpone the International Yacht Regatta from April, 1915, to September, 1915, and the following races have been arranged for during the regatta, which will be held between August 14th and September 5th, inclusive: Four races under international rules of 6, 8, 10, and 12 meters; four races under classes "N", "P", "Q", and "R"; one race in the Sonder class, and one for schooner yachts. The first races mentioned will be of most interest to motor boatmen, and President Wilson has offered a cup for the winner of the 12-meter race. Copies of information pamphlets and entry forms may be obtained upon application addressed to the Yachting Bureau, Panama-Pacific International Exposition, San Francisco, Cal.

* * *

Boat Races at Miami Proposed.

Mr. Carl G. Fisher, of Indianapolis, is making strenuous efforts to put through some big races to be held at Miami, Fla., this winter. It is stated already that Commodore Blackton will have his Baby Speed Demon II and Baby Reliance V there, and it is to be hoped that in the interest of the sport Commodore Pugh's Disturber IV will be among the entrants.

* * *

Canadian National Exposition Races.

The annual boat races given by the Canadian National Exhibition were held this year as usual over the lake course in front of the Exhibition Grounds. Although not having as many entries as in former years, the races were interesting and closely contested. The race for the Benton $1,000 Gold Cup, emblematic of the Great Lakes International Championship, was made most interesting through the presence of Buffalo Enquirer, but the weather was bad and the hydroplane did not make her best showing. However, this gave the displacement boats a chance to make a closer race.

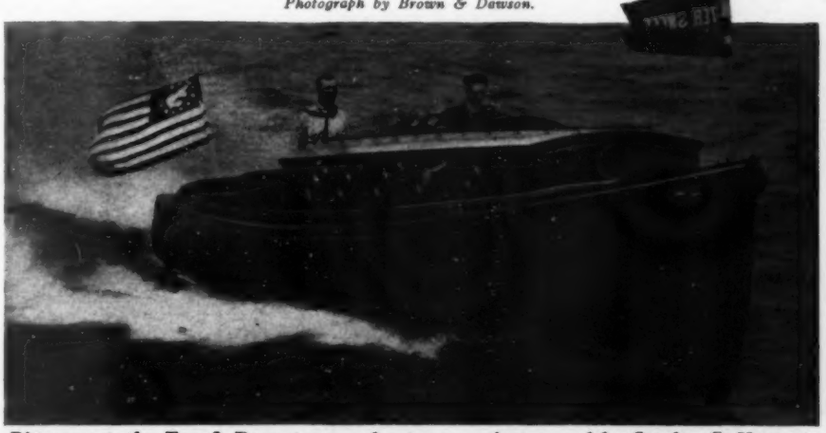
Soon after the start Buffalo Enquirer led the way, closely folowed by Heloise, owned by W. H. Gooderman, with Marjorie II, owned by A. G. Penman, and powered with a Sterling motor, and Ormond, a Van Blerck-powered boat owned by D. T. Rees, fighting out a good battle between themselves. Enquirer had to run back inside the course owing to the heavy seas, and thus added practically a mile to each five-mile lap, but she finished the 35-mile course in 1:07:30. Marjorie II won the tussle between the displacement boats by 20 seconds, thereby evening up a defeat registered against her by Ormond earlier in the week.

* * *

Grand Rapids Motor Boat Club Holds Regatta.

The Grand Rapids Motor Boat Club of Grand Rapids, Mich., recently held their final outdoor picnic at Devil's Elbow, about 15 miles above Grand Rapids on the Grand River. A fleet of between fifteen and twenty boats turned out and over a hundred members made the trip. After a ball game in the afternoon, which was won by the boat owners, several races were pulled off. The 32-foot Edna II owned by W. Burgess, equipped with a six-cylinder 50 h. p. Burgess motor, had little difficulty in winning the free-for-all, covering the course at the rate of 26½ miles per hour. In the restricted class for boats under 30 feet in length, Lois, owned by George Burgess, took first place, while Addie May, owned by P. Vellema, took second. The feature of the afternoon was the bang-and-go-back race which was won by Fleet Captain George Hooker's Sailor. This club has purchased 800 feet of river front and will start building a new clubhouse early in the spring.

Photograph by Brown & Dawson.



Bittersweet, the Fay & Bowen-powered express cruiser owned by Stanley C. Vansant, which took first in her class at the finals of the S. J. R. A. at Atlantic City.

* * *

Annual Races of Middletown Yacht Club.

There were thirty entrants in two classes in the annual races of the Middletown Yacht Club, of Middletown, Conn., and thirteen of these were disqualified for exceeding their record time by more than 30 seconds. The course was 8 nautical miles in length with one turn, and Indian II, a displacement boat owned by Oscar Hedstrom finished this distance in 20 minutes and 14 seconds, or at a rate of 27½ statute miles per hour. In Class I, for boats under 30 feet, places went to the following boats: (1st) Neenah, owned by A. F. Lewis, (2nd) Star, owned by Wm. Comiskey, (3rd) Ruth C., owned by H. E. Clark, and (4th) Marjorie C., owned by W. H. Crowell. The time prize went to Star, and the first-to-finish prize to Limit, owned by Curtiss S. Bacon. In Class II, 1st went to Lady Marjorie, owned by C. H. Norriss, 2nd to Marion, owned by G. W. True, 3rd to Defiance, owned by Cornell & Marble, and 4th to Folly, owned by S. A. Miner. The record prize in this event went to Marion, while Privateer, owned by E. Gardiner, was the first to finish.

* * *

Revival of Racing at Moline.

The Moline Launch Club, of Moline, O., recently revived motor boat racing in their city by offering five cups to be raced for in five different classes. About a dozen boats turned out and several thousand interested spectators lined the course to watch the events. Vice-Admiral E. H. Van Patten of Davenport, who was the official starter, stated that not in the whole season's racing of the Mississippi Valley Power Boat Association had he seen a course laid out with such easy angles for the turns, and that were it not for the low water in July this course would be ideal for the big regatta now held at Peoria. The winners of the five cups will defend them next year, when it is expected that even greater interest will be shown in the races.

* * *

Fulton M. B. C. Regatta.

The fourth annual fall regatta of the Fulton Motor Boat Club was held recently at their clubhouse. The regatta was a great success and was pronounced one of the most successful ever held on the Hudson River.

Various races were held in the afternoon, and in the evening the club gave one of its popular dances, after which refreshments were served in the ship cabin of the club.

New Things For MOTOR Boatmen

Clark Flexible Couplings.

The Clark Flexible Coupling Co., of 90 West Street, New York City, is marketing a new type of flexible coupling for use in motor boats. This coupling provides a flexible connection between the propeller shaft and power plant, thus doing away with the troubles produced by misalignment. The coupling consists simply of two sprocket-cut hubs held flexibly together by a roller chain. The makers state that there are no delicate parts to wear, it is noiseless in operation and is unaffected by moisture.

* * *

Kemp Air Propeller Outfit.

The accompanying illustration shows the 16 h.p. Kemp air propeller outfit, manufactured by the Kemp Machine Works, of Muncie, Ind., for use with motor boats and ice boats. It is said that with conditions favorable on the ice this outfit can drive an ice boat at speeds pretty close to 100 m.p.h. The motor is a 4-cycle 2-cylinder opposed machine having bore and stroke of four inches. It is air-cooled, and is equipped with Schebler carbureter and Rhoades Unit Spark ignition system. The cost is $265.

* * *

"Pull-U-Out."

The Pull-U-Out Manufacturing Company, of 909 Pine St., St. Louis, Mo., are the makers of a device which they state can be used with great satisfaction for pulling a small boat—say a 20-footer—out of the water, while it may also be used as a chain hoist. The mechanism consists of a six-inch winding drum carrying thirty feet of quarter-inch steel rope, and having internal gearing which engages a bronze pinion on a long ratchet crank. The frame which carries the drum and gearing is provided with hook bolts and a sheave or block. Three steel stakes of special design are included in the outfit, which sells for $15.

* * *

Lonergan "Apex" Oil Cup.

The "Apex" oil cup, manufactured by the J. E. Lonergan Co., of 211-215 Race St., Philadelphia, Pa., is made with a filling slide which renders the removal of the cap unnecessary. An automatic ball valve in the shank so operates that the oil is allowed to feed only by the vibration of the motor, and the quantity may be regulated by placing varying amounts of waste in the cup.

* * *

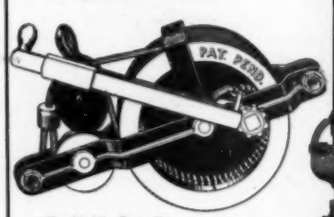
Muir Model E Carbureter.

The Muir Company, of 1216 Dime Bank Building, Detroit, Mich., have introduced their Model E carbureter, which has been especially designed for use on small engines Model E is a multiple jet carbureter giving a correct mixture through a range of speeds with free air passage at top speed. The float needle and seat are of special alloy and are accurately ground. The cost is $4.50.

Clark flexible coupling.

The Kemp 16 h.p. air propeller outfit.

Sireno horn switch.



"Pull-U-Out."

Holman air whistle.

Burd high-compression piston ring.

The Lonergan easy-filling "Apex" oil cup.

New Sireno Horn Switch.

The Sireno Company, of 18-20 Rose St., New York City, have introduced a neat and effective switch which will be furnished with all types of Sireno horns. The switch is made of insulating material in order to do away with any possibility of grounds on the ignition system. The switch is sold separately at $1.

* * *

Holman Air Whistle.

E. E. Gross, of 415 W. Acacia St., Stockton, Cal., is the manufacturer of the Holman air whistle, for which a number of new points are claimed. The resounding bell is designed to protect the port from outside air influence, and is also adjustable to regulate the pitch of the whistle so that it will give any invariable sound desired. The whistle is simply constructed, can be adjusted to any air pressure, and its sound carries for a great distance. It is claimed that only four pounds of air are consumed at one blast. The cost is $7.50, complete.

* * *

Burd Piston Rings.

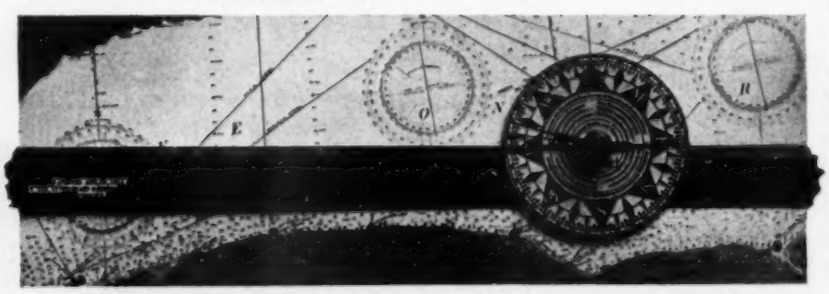
Burd piston rings are made by the Burd High-Compression Ring Co., of Rockford, Ill., of a special mixture of best gray iron of great elastic and heat-resisting properties. It is stated that by reason of a new method of manufacture they are in perfect circle when in the cylinder, forming an absolutely tight dam past which the gases cannot escape. Another feature of these rings is the new patented rust-proof bronze coupler which seals the opening in the ring. This coupler is so designed that the ring can expand without leaving any opening.

* * *

C. A. P. Course Protractor.

Captain C. A. Potter, of Oswego, N. Y., has just patented the C. A. P. course finder and course converter for which great accuracy and ease of manipulation is claimed. The construction of the protractor may be seen from the accompanying illustration. In use the direction bar is placed on the chart so that the edge connects the points of departure and destination. The compass disk is then slid along the bar until the north and south or the east and west points on the dial coincide with either a meridian or a latitude parallel, as the case may be. The true course is then indicated by the lower fixed pointer. T. C. In order to apply the variation to the true course found, the pointer M. C. is moved to the right or left according to the amount of westerly or easterly variation indicated on the chart, when the magnetic course will be indicated. Then to apply the known compass deviation, move the pointer C. C. to the right or left as required, according to the directions on the dial; this pointer will now indicate the compass course.

The Muir Model E carbureter.



The C. A. Potter course protractor for which accuracy and ease of manipulation are claimed.

Durkee's denatured gasoline iron.

The Allan self-adjusting wrench.

The Durkee bilge bailer.

Durkee's Latest.

C. D. Durkee & Co., of 2 South St., New York City, have just come forward with several new things which will be of interest to the motor boatman. The first of these is their Pyro denatured gasoline flat-iron, which should prove mighty handy when it is not feasible to send ashore and get that pair of white ducks ironed by professional hands. Their bilge bailer, shown in the accompanying illustration, connects up with the bilge pump, and is so designed that it may be inserted in many difficult and out of the way places in the bilge to suck up gasoline or water. The Ketchum and the Rusher gasoline protectors are intended for installation on motor boats to prevent theft of gasoline. Their construction is simple, and they are installed in such a way that is impossible for a thief to remove them, or to insert a hose in the fuel tank and draw off the gasoline.

* * *

Sprung Patent Spark Plug.

A. Sprung, consulting electrical engineer, of 126 West 118th St., New York City, is the inventor of a spark plug which is rather a departure from precedent. A bushing or adapter containing an insulated terminal electrode is inserted within a recess formed at the bottom of the plug and the electrode is so adapted that it will make positive contact with the main portion when it is in its proper position. The adapter also carries the other electrode which is grounded to the casing. The advantage claimed for this removable adapter is that the sparking point alone can be renewed readily by unscrewing it from the main spark plug.

* * *

R. O. C. Superheater.

This device which is sold by the R. O. C. Sales Co., 1777 Broadway, New York City, is an aluminum or bronze casting, circular in form, which is attached to the gasoline line near the carbureter for the purpose of heating the fuel in order to make it vaporize thoroughly and thus increase the efficiency of the motor. The gasoline is let into a bowl having a baffle plate integral with the casting, which will prevent any floating foreign matter in the gasoline from entering the carbureter, and this bowl is jacketed so that a portion of the exhaust gases may be allowed to flow around it, furnishing the necessary medium for heating the gasoline while yet in a liquid state. The price of the device is $3.50.

* * *

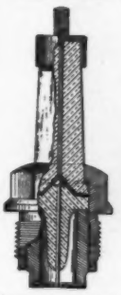
Reliance Special Wheel.

The W. S. Hall Co., of 16 Cortland St., Rochester, N. Y., have just brought out a new steering wheel for the 1915 season, called the Reliance Special. The feature of this outfit is that the rim is pivoted and removable so that it may be raised out of the way to allow the operator easy entrance to his seat, and removed entirely and stowed away when the boat is not in use, in order to prevent theft.

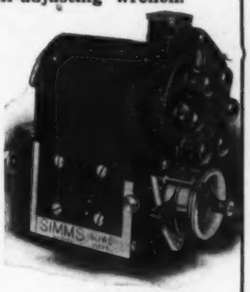
* * *

Westinghouse Meters.

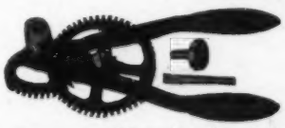
A new line of 5-inch diameter direct-current portable ammeters, voltmeters, and millivolt meters, known as the type P W, has been introduced by the Westinghouse Electric & Mfg. Co., of East Pittsburgh, Pa. These instruments are direct reading and suitable for battery testing signal work and all purposes where an instrument of pocket size is desirable. Operating on the D'Arsonval principle, they have a moving coil and a permanent magnet designed to render them free from residual errors. The complete movement is mounted as a unit. A feature is the arrangement of the moving element so that it may be readily removed for repair and replaced in position with the utmost accuracy.



Sprung spark plug.



The Simms 1915 waterproof 6-cylinder magneto.



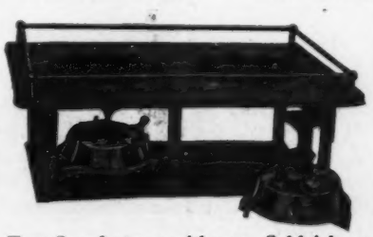
Merry's valve grinder.

R. O. C. superheater.

Reliance Special tilting steering wheel.

Westinghouse type PW voltmeter.

Genco hydrometer syringe.



Two-Juwel stove with new Schleicher-brackets.

Allan Wrench.

The A. C. Allan Specialty Mfg. Co., of 420 West 63d St., Chicago, Ill., make a wrench which is self-adjusting to any size of pipe or nut by simply placing the jaws in position and pulling on the handle—the harder the pull on the handle, the tighter the grip on any object which the jaws have taken hold of. The wrench has a crooked handle which is reversible.

* * *

Simms Dual System.

The Simms Magneto Co., of East Orange, N. J., have introduced their Model D dual system in order to meet the demand for a dual system of ignition giving a battery spark for starting. This may be readily attached to their independent high-tension magnetos, thereby converting them into dual systems. In order to convert the independent magneto to a dual, it is only necessary to exchange contact breakers and to substitute the moisture-proof cover for the commutator. In addition to the contact breaker and commutator, a Model D coil and switch, and a stud screw are provided with the new equipment.

* * *

Merry's Valve Grinder.

A neat valve grinder designed to deal with all types of valves is being manufactured by Edward Merry, of 395 Allen St., Springfield, Mass. It may be operated by either lever at from 150 to 200 revolutions per minute. An outward stroke of the lever turns the valve three and a half times, and the return stroke turns it back similarly. It is said that the tool will grind a valve properly in from ten to fifteen minutes. Lard oil and flour of emery are used as a grinding medium and the tool costs $2.50.

* * *

Genco Syringe.

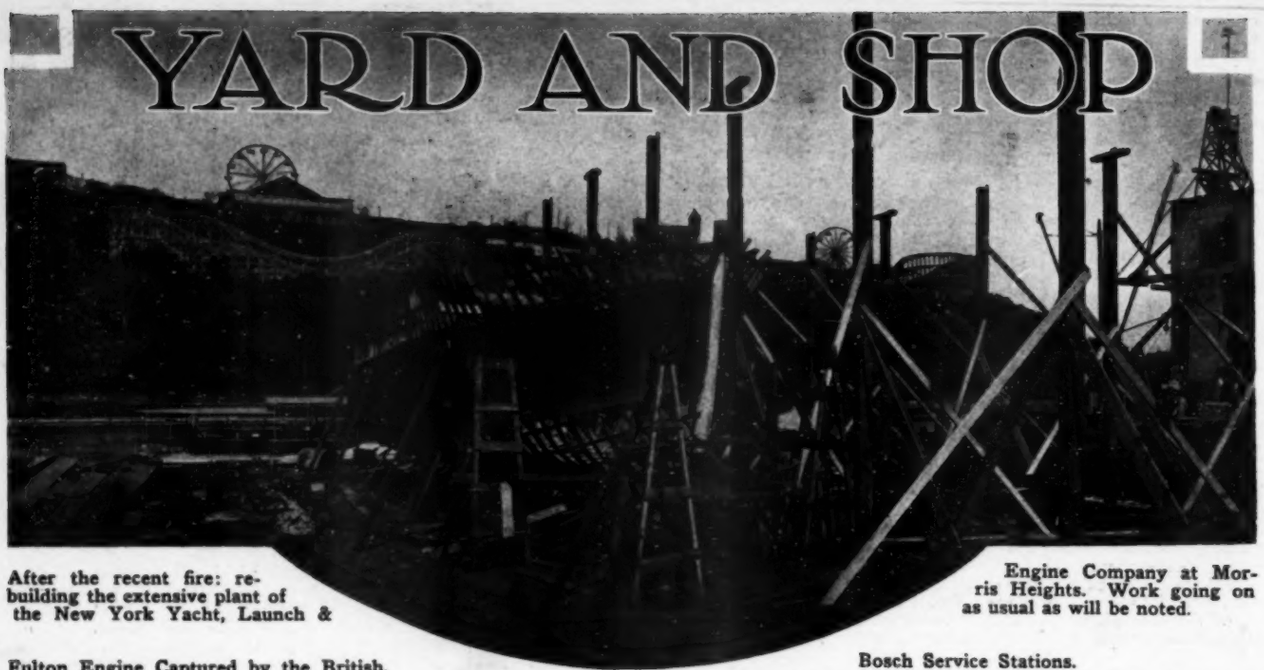
The General Scientific Equipment Co., of 2718 W. Lehigh Ave., Philadelphia, Pa., make a hydrometer syringe, the nozzle of which is of rubber so that it may be inserted in portions of a battery where a rigid nozzle cannot penetrate. The hydrometer, which is graduated from 1,100 to 1,300 specific gravity, costs $1.75, cased.

* * *

Juwel-Schleicher Stoves.

The Globe Gas Light Co., of 25-27 Union St., Boston, Mass., have introduced a recent improvement in the mounting of their Juwel kerosene vapor oil stoves, which makes for increased cleanliness and ease of operation. This improvement consists of the adoption of the Schleicher patent brackets which fit into the frame with the single-burner stoves in them. They are hinged, and can thus be swung out for filling and cleaning, and while they are in this position the frame can be readily cleaned. The two-Juwel 6A oil stove, with Schleicher brackets, costs $16.50.

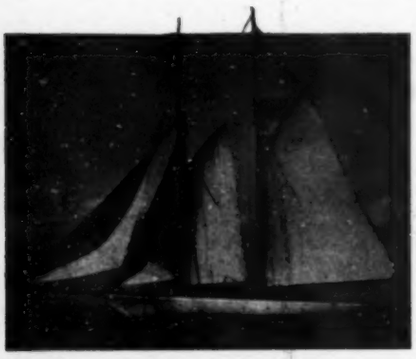
YARD AND SHOP



After the recent fire: rebuilding the extensive plant of the New York Yacht, Launch & Engine Company at Morris Heights. Work going on as usual as will be noted.

Fulton Engine Captured by the British.

The great war was brought home rather directly to the Fulton Mfg. Co. of Erie, Pa., the other day when they received word that one of their 12-16 h. p. Fulton Special engines, shipped to Mr. Cliff C. Dentry, Melbourne, Australia, on board the German ship Birkenfels, had been captured by a British steamer off Capetown, Africa. They state, however, that they will not lose the engine, as appearance was made at the Prize Court, and the engine will be forwarded. Whether or not the brief possession of this motor has any bearing on the case, English firms have recently placed orders with the Fulton people for four of their machines to be delivered at Liverpool, England.



Auxiliary schooner yacht Gulma, powered with a 36-42 h.p. Wolverine engine.

* * *

"Record" Trophy Winner Is Frisbie-Powered.

Eugenia, owned by Dr. Eugene Swayne, of Philadelphia, winner of the Philadelphia "Record" trophy race to Ship John light, mention of which race was made last month in this magazine, was aided and abetted in winning this race, it appears, by her 3-cylinder 12-18 h. p. Frisbie motor. After the installation of this outfit in mid-summer Eugenia spruced up and showed the others her heels in a number of races, but the winning of this 84-mile contest firmly planted the crown of laurel on her owner's brow. Eugenia measures 34 feet length by 9 feet 6 inches beam and 4 feet draft. She has a gasoline capacity of 185 gallons, carries 45 gallons of water, 15 of lubricating oil, 10 gallons of alcohol for galley use, and 500 pounds of ice. She turns a 24-inch, 3-bladed, Hyde propeller and is equipped for deep-sea cruising.

* * *

Gordita, a 25-Footer.

One of the photographs on this page shows Gordita, which, being interpreted, is the "fat little one." Though named by her designer and owner, Mr. Samuel H. Brown, of Marblehead, Mass., the cognomen does not seem to fit the boat, as she has the appearance of a trim, good-driving model. Gordita is 25 feet long, has a beam of 6 feet 6 inches, a draft of 1 foot 10 inches, and powered with a 12 h. p. Kermath made a speed of 9 miles per hour on her trial trip. It is figured that when the outfit is limbered up and in running trim, a speed of 10 to 10½ miles will be obtained.

* * *

Disturber IV Uses Columbians.

In a recent unofficial test made on Lake Michigan, Commodore Pugh's fast racer, Disturber IV is reported to have made unprecedented speed. It is interesting to note in connection with this record that Disturber is equipped with Columbian P. R. M. hydroplane propellers, manufactured by the Columbian Brass Foundry, of Freeport, L. I., and similar to those used on Disturber III.

Eugenia, winner of the Philadelphia "Record" trophy race to Ship John light. She is equipped with a 3-cylinder, 12-18 h.p. Frisbie motor.

Bosch Service Stations.

The Bosch Magneto Co., of New York City, have recently added to their already long list, service stations in the following cities and towns, where Bosch owners may obtain immediate and satisfactory service: Olympia Auto Supply Co., 221 4th St., Olympia, Wash.; G. O. Reynolds, Inc., 316-318 Main St., New Rochelle, N. Y.; the North West Garage, Cherokee, Ia.; T. A. Bryson, 5-9 Perry St. E., Savannah, Ga.; the Clyde Garage, Charleston, S. C.; the Max Gottberg Auto Co., Columbus, Neb.; I. P. Todd, Cor. Franklin & Pickaway Sts., Circleville, O.; the Graham-Seltzer Co., 120-122 Main St., Peoria, Ill.; and the Pendleton Auto Co., 812 Johnson St., Pendleton, Ore.

Gordita, a 25-footer, powered with a 12 h.p. Kermath motor, which showed 9 m.p.h. on her trial trip.

* * *

Van Blerck Motors on Chesapeake Bay.

The Van Blerck Motor Co., of Monroe, Mich., state that the success and popularity of their motors on the waters of Chesapeake Bay during the past season give them every reason to suppose that this cruising ground will prove to be a Van Blerck stronghold during the coming season. Silver Heels, built by the Mann Yacht Building Co., of Baltimore, and powered with a 50 h. p. intermediate speed Van Blerck is a 25-foot runabout in which they take considerable pride as she has given a good account of herself in the summer's racing, and in demonstration runs has logged as high as 65 miles with her motor turning over at 1,000

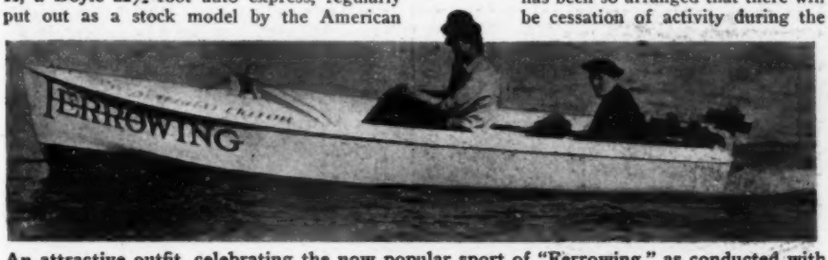
r.p.m. without a stop. This boat is owned by Mr. B. B. Friedenwald under whose name she has been raced. Another boat built by the same company and having a 75 h. p. Van Blerck is Sylmae, owned by Dr. Sylvan H. Likes, of Baltimore. She has given excellent satisfaction in taking the Doctor and his friends from his home on the Rhode River to any place he wanted to go on the Chesapeake. An express cruiser similar to the 36-footer, Sylmae, but somewhat larger, has been ordered from the Mann company to be equipped with a 100 h. p. high-speed Van Blerck.

* * *

A Speedy Little V-Bottom Boat.

A V-bottom boat which has created a great deal of local interest is shown in one of the photographs on this page. This is Sunnyside II, a Doyle 22½-foot auto express, regularly put out as a stock model by the American Launch Co., of Bayonne, N. J. She is equipped with a 2-cylinder 4 x 3½-inch Roberts motor, and turning a 14 x 21-inch Columbian propeller is credited with a consistent speed of 12½ m. p. h. This boat, which has a beam of 5 feet 1½ inches, is owned by Cliff Hadley of Ozone Park and Goose Creek, L. I., and has been used by him for the past three seasons. Mr. Hadley states that in this time she has been entered in several races and that she has finished in first or second place every time. Mr. Hadley also states that the rougher the weather the better it suits him, and that choppy waves have very little effect on him.

Silver Heels, a 25-foot runabout, powered with a 50 h.p. intermediate-speed Van Blerck motor. B. B. Friedenwald is the owner and the Mann Yacht Building Co., the builders of this boat, which has been very successful on Chesapeake Bay this summer.



An attractive outfit, celebrating the now popular sport of "Ferrowing," as conducted with the Ferro Company's rowboat motor.

* * *

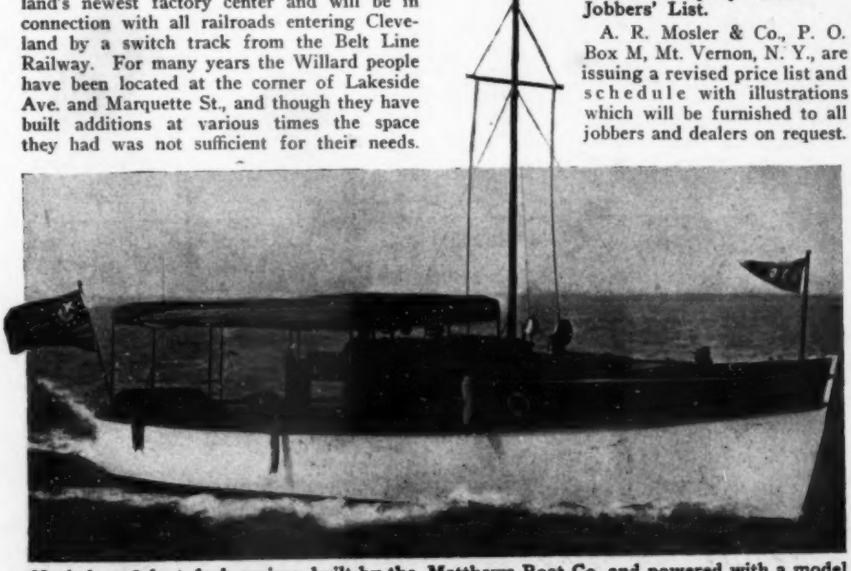
Willard Builds New Plant.

The Willard Storage Battery Co., of Cleveland, O., broke ground for their big new factory on East 131st St., recently, and hope to have the roofs on the administration and several other buildings before snow flies, so that they may be ready for occupancy as soon as possible in the early spring. This factory which will have six acres of floor space, covers part of a ten-acre lot situated in Cleveland's newest factory center and will be in connection with all railroads entering Cleveland by a switch track from the Belt Line Railway. For many years the Willard people have been located at the corner of Lakeside Ave. and Marquette St., and though they have built additions at various times the space they had was not sufficient for their needs. This new plant, which will have all the latest improvements in factory design, will be started going before the company moves from its present location, and the program has been so arranged that there will be cessation of activity during the process of moving. Among the interesting features to be installed in this new all-brick factory, are a sprinkler system throughout, lunchrooms for the office and factory forces, bathrooms, locker rooms, and a complete hospital for the care of the employees under the supervision of a physician regularly employed by the company.

* * *

Mosler Company Issues Jobbers' List.

A. R. Mosler & Co., P. O. Box M, Mt. Vernon, N. Y., are issuing a revised price list and schedule with illustrations which will be furnished to all jobbers and dealers on request. They have also compiled a list of jobbers and suggest that any legitimate jobbers desiring to secure the very lowest quotations should communicate with them with a view to having themselves included in this list.



Norbel, a 38-foot deck cruiser, built by the Matthews Boat Co. and powered with a model 13, 25 h.p. Loew-Victor engine. The boat is owned by C. H. Stroble, Sandusky, Ohio, and makes 10 m.p.h.

* * *

Alma, of Panama.

Alma, shown in one of the photographs on the next page, is a very interesting boat owned by Mr. George W. Healey, of Corozal, Canal Zone, Panama. She measures 40 feet in length by a beam of 8 feet and a draft of 2 feet 6 inches, and is powered with a 24 h. p. medium-duty Regal engine equipped to burn kerosene. Alma is of especial interest because of the rare and beautiful woods used in her interior construction and decoration. These woods have a history, too, since they are cut from the old Panama railroad ties, some of which had been in the ground since 1855.

* * *

Loew-Victor Receives New Order from Navy.

The Loew-Victor Engine Co., of Chicago, Ill., have just received an order from the Navy Department for one of their 6-cylinder 60 h. p. machines to be installed in the barge attached to the flagship of the Pacific Coast Squadron. They announce that this is the sixth order which they have received from the Navy Department for similar engines to be installed in tenders of the Pacific Fleet.

Sunnyside II, a 22½-foot Doyle auto express, built by the American Launch Co. She has a 2-cylinder, 4x3½-inch Roberts motor and a 14x21-inch Columbian propeller, and consistently does 12½ m.p.h.

* * *

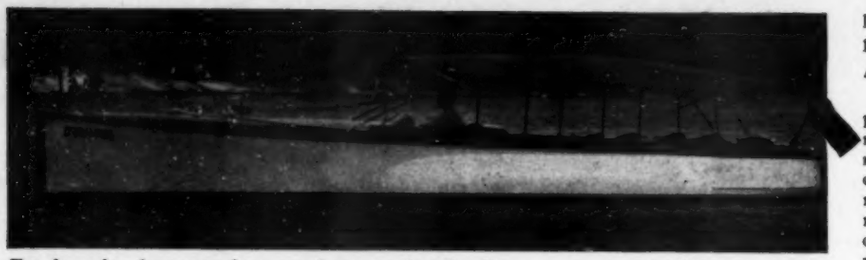
Outboard Motor Boat Runs Rapids.

According to the Washougal Times, of Washington, Truman B. Cook, the youthful owner of a 15-foot 6-inch rowboat powered with a Ferro outboard motor, distinguished himself recently by running an 8-mile stretch of bad rapids in less than half an hour. The trip was made for the purpose of receiving mail from home more quickly than would have been possible if he had waited for the local tender to make its occasional journies.

* * *

Demonstration Cruise Started by Anderson.

Chas. E. Wellman, Sales Manager of the Anderson Engine Co., of Chicago, Ill., has started on an extended cruise in his new 40-foot bridge-deck cruiser, Clio II, down the Drainage and the Illinois & Michigan Canals, Illinois and Mississippi Rivers, and the Gulf of Mexico to Florida. The trip is being made in the interest of the Anderson engine, and Mr. Wellman intends to stop at all important points en route.



Frank, a handsome 30-foot runabout, equipped with a 25-30 h.p. Buffalo auto-marine engine. W. E. Wright, of Winnipeg, is the owner.

New Field for Heavy-Duty Engines.

A new field for the powerful heavy-duty engine has been opened by experiments made with fishing "drifters" or trawlers, in the North Sea off the coast of England. These trawlers are the bigger boats of the fishing fleet, and, owing to the bulkiness of steam engines, have, in the past, principally relied on sails for their motive power. One of the pictures in this section shows Director, owned by Messrs. Bain & Morrison, one of the first of these trawlers to be converted into a power drifter by the installation of two 40 h. p. heavy-duty Scripps engines, turning twin screws.

* * *

Minnemac II Powered With Winton.

In our October issue we published a short description of Minnemac II, an 80-footer built by Geo. Lawley & Son Corporation, of Neponset, Mass., after designs by Cox & Stevens of New York City. We are informed that the owner of this boat, Mr. Norman MacDonald, has recently changed her motor installation and that she is now equipped with a 125 h. p. Winton engine, made by the Winton Gas Eng. & Mfg. Co., of Cleveland.

* * *

Bruns Kimball Co.'s Repair Service.

Bruns Kimball & Co., of New York City, make the announcement that they are now ready to give owners of Sterling engines the advantage of their complete service department. They have prepared order blanks for this purpose, which are issued upon request, and in order to have a mechanic, trained at the Sterling shops, come to look over an engine of this type, it is only necessary to fill out the blanks and mail. At this time of year, the company state, they are in a position to fill orders without the slightest delay, which may not prove true in the spring.

* * *

New Kermath Engine.

The Kermath Mfg. Co. announces that, owing to an insistent demand for a larger engine than the 12 h. p. plant that the company has previously concentrated on, a new model 20 h.p., 4-cylinder, 4-cycle plant will be put out. The design is described as being very compact, cylinders cast en bloc, weighing, all told, less than 400 pounds. The speed will range from 600 r.p.m. to 1,200 r.p.m., and it is figured that the engine will handle a 20-inch 24-pitch three-blade propeller of wide area at 600 r.p.m. and for cruiser, speed boats and family type craft will handle smaller propellers. This model will be particularly adapted to work boats, operating at slow speed. When medium heavy duty is required, an extra heavy flywheel will be fitted.

* * *

Fulton Boat Shows Good Speed.

The Fulton Mfg. Co., of Erie, Pa., announces that in the race for the Challenge Cup for the fastest boat on Currituck Sound, the boat owned by Mr. Melson took first honors. This craft is 26 feet over all with a beam of 5 feet and 2 feet 2 inches draft, and is equipped with a 16 h. p. 4-cylinder 4-cycle high-speed Fulton engine turning a weedless propeller.

* * *

A Correction.

In the Clubs page of our October issue we published pictures of Daneva II and Charmian, two cruisers which figured in the summer's races of the South Jersey Racing Association. Through error we stated that these racers had captured first and second places, respectively, in the final races of this association, whereas, as a matter of fact, these wins were registered in the races of August 29th, a week previous to the finals. In the latter events, Bittersweet, owned by Mr. Stanley C. Vansant of Atlantic City, and powered with a Fay & Bowen engine, took first place, beating Daneva II, the only other entrant, by 1 minute and 28 seconds.

The fine plant of the Willard Storage Battery Co. at Cleveland, as it will appear after being completed.

Lamb Engine and Hyde Wheel Prove Good Combination.

The Long Distance Cruiser Championship of the Pacific Coast was won this year by Elmo II, owned by Mr. John Donaldson of Pasadena, Cal. The course over which this race was run is 78 nautical miles in length, covering the distance between Stockton and Sausalito, but the remarkable part of Elmo's performance is that after only a 20-mile trial run, and just previous to the start of the race, she made the run from San Pedro to San Francisco, a distance of 423 nautical miles in the open sea. This achievement gives satisfaction to several people beside her owner and crew—to the Hyde Windlass Co., of Bath, Me., because Elmo is fitted with a Hyde turbine type propeller, and to the Lamb Engine Co., of Clinton, Ia., because she is powered with a 30 h.p., 4-cyl. Lamb engine.

* * *

Kermath Plans Foreign Invasion.

Previous to the commencement of general hostilities in Europe, The Kermath Mfg. Co., of Detroit, Mich, enjoyed a large export trade to all of the countries now engaged in fighting, but further shipments are now cut off because of the great conflict. Mr. James Kermath, general manager, and Mr. J. F. Farr, sales manager, therefore, immediately turned their attention to other foreign fields, and a vigorous invasion of Australia, New Zealand, China, Japan, the Philippines and South America has begun.

English trawler Director, the first "drifter" to be converted to gasoline power by the installation of two Scripps 40 h.p. heavy-duty motors.

Alma, a 40-footer, owned at Corozal, Panama. She is powered with a 24 h.p. medium-duty Regal engine, equipped to burn kerosene.

MOTOR BOATING ADVERTISING INDEX

THE MOTOR BOATING MARKET PLACE

The rate for "For Sale" and "Want" advertisements is 3 cents per word. If an illustration is used the charge is as follows, which includes the making of the cut:
Cut one inch deep, one column wide..... $2
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32 BROADWAY, NEW YORK CITY
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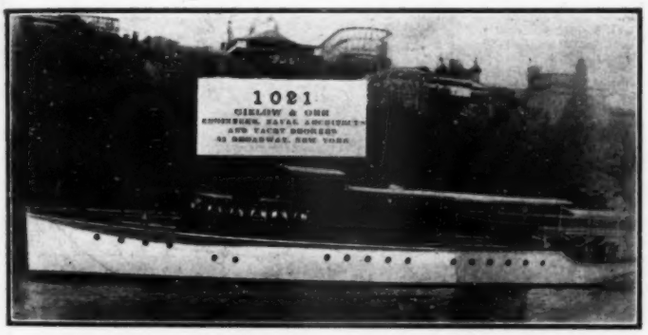
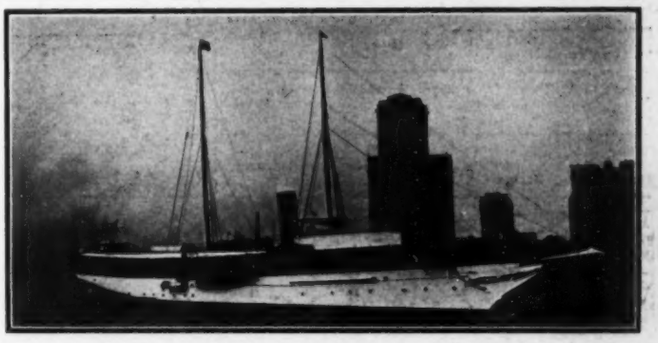
30-ft. Elco Mahogany Runabout, Standard motor	$ 900
35-ft. Raised Deck Cruiser, Standard motor	1,500
42-ft. Cruiser, long cockpit, Speedway	2,500
49-ft. Florida Cruiser, 2 ft. draft	2,500
48-ft. Modern Cruiser, Murray & Tregurtha	3,000
54-ft. Elco Day Cruiser, high grade	6,200
51-ft. Modern Cruiser, Automatic motor	2,000
50-ft. Long Cockpit, good accommodations	2,500
55-ft. Ideal Florida Cruiser	3,500
68-ft. Twin Screw, Standard motors	5,500
70-ft. Flush Deck, two Buffalos	6,000
75-ft. High Grade Modern, two Craigs	12,000
93-ft. Elco Build, two Standards	10,000
92-ft. 20th Century Cruiser	8,500
105-ft. Cruiser, two Standards	35,000
110-ft. Cruiser, three Sterlings	35,000
120-ft. Cruiser, two Speedways	45,000

HOUSEBOATS AND MOTOR BOATS NOW IN FLORIDA FOR SALE OR CHARTER.



No. 1021.—Sale or Charter.—Flush deck 83 ft. cruising motor yacht. Speed 14 miles. Electric lights. Well found. Excellent seaboat. Reasonable. Gielow & Orr, 52 Broadway, New York.



No. 878—An exceptional bargain; modern steel steam yacht; length 145 ft.; splendid accommodations; beautifully decorated; speed up to 15½ knots. Condition as good as new. For full particulars address FRANK BOWNE JONES, Yacht Agent, 29 Broadway, New York.

DOMAN MOTORS

One 20 H. P., 4- cyl., 5 in x 6 in., $625—one 24 H. P. 3-cyl., 6 in. x 8 in., Heavy Duty, $900. BRAND NEW 1914 models with bronze shaftwheel, etc. Complete outfit. Both motors have Paragon gear (enclosed) on one bed. Bosch ignition, Detroit feed oilers, etc. Must move them to make room for new stock. Year's guarantee. H. C. Doman Co., Baltimore Branch, 514 E. Pratt St., Baltimore, Md.

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J. S. Hildreth Adv. Mgr. — **119 West 40th St.** New York

SECURE YOUR NEW MOTOR NOW AT SECOND-HAND PRICES

New 1914 models, embodying all improvements incorporated during the Spring and Summer months, are offered at the following reduced prices:

Type—B4, 4-cylinder, medium duty, 5x6"—30 h.p. Regular net price, $860. Special sale price.....$690.00

Type—B6, 6-cylinder, medium duty, 5x6"—45 h.p. Regular net price, $1,200. Special sale price.....$880.00

Type—B4—Special, 4-cylinder, medium high speed, 5x6"—50 h.p. Regular net price, $1,020. Special sale price $710.00

Type—C4, 4-cylinder, high speed, 5½x6"—65 h.p. Regular net price, $1,160. Special sale price.....$760.00

Type—C6, 6-cylinder, high speed, 5½x6"—100 h.p. Regular net price, $1,760. Special sale price.....$1,120.00

Each engine is covered by full year's guarantee and includes complete catalog equipment.

FACTORY REBUILT BARGAINS

One 6-cylinder, 5½x6"; 75-h.p. Van Blerck. Desirable for express cruiser at 900 r.p.m. Special sale price..$500.00

One 6-cylinder 5½x6"; 75-h.p. Van Blerck. A bargain for runabout or express cruiser installation up to 900 r.p.m. Special sale price.....$450.00

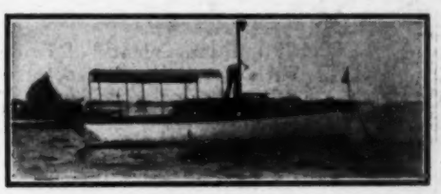
One 8-cylinder 1913 model, 5½x6" Van Blerck, guaranteed. Special sale price.....$900.00

One Model-S, 6-cylinder Scripps motor, 5½x6", double ignition. Price $475.00

One 3-cylinder, 25-h.p. Ferro, 5x5", Bosch magneto ignition, reverse gear and complete engine, 1913 model. Price $250.00

Write for Catalog and Complete Information

VAN BLERCK MOTOR COMPANY
MONROE, MICHIGAN



Queen B—For Sale—27 ft.; beam 7 ft. 6 in., draft 2 ft. 6 in. Excellent condition; everything complete; 9 H.P. Stanley engine; Apple dynamo; electric lights; tender. $750.00. Make offer. Arthur L. Barr, 72 Chauncy St., Boston, Mass.

80 H.P. Jager 4 cyl. 4-cycle, heavy-duty: One pair at $825.00 each.
50 H.P. Ralaco 4-cyl., 4-cycle, heavy-duty: One pair at $750.00 each.
A bargain in a 31' x 6' 9" Runabout at $600.00.
A 28' Runabout hull for $500.00.
40 H.P. Holmes 4-cyl., 4-cycle, medium duty at $750.00.
THE HOLMES MOTOR COMPANY, Inc., West Mystic, Conn.

CYLINDERS REBORED—Pistons and rings fitted, new cranks, connecting rods, cases, transmissions, any part for automobile or motor boat motor reproduced like original. The shop of quality. McCadden Machine Works, Minneapolis, Minn.

WANTED—A neat, intelligent young colored man, 21 years, desires a position working on house boat, private yacht, launch or regular steamship. Willing to begin at anything. Willing to go abroad or remain in America. Will remain permanent if necessary. Can furnish best of references. Address, J. A. Brooks, 324 West Liberty St., Savannah, Ga

FLORIDA TOURISTS' BOAT LINE FOR SALE.

Spend your winters in warm weather. Ship as Captain or Purser on your own boats, and meet fine people. Get large interest on money. McCoy Bros., Daytona, Fla.

FOR SALE—Special built four-cylinder, four-cycle, marine motor, 20 H.P. Remy magneto, Schebler carburetor, reverse gear outfit and raised starter. Fine condition. Bargain at $145.00. Chas. Silliman, Elgin, Ill.

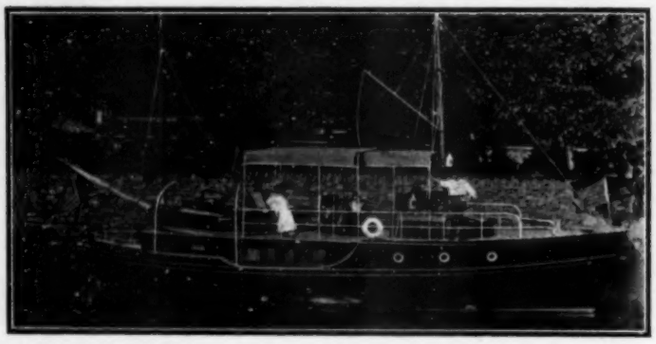
Aerothrust engine, $40; 2 h.p. Dunn motor with Schebler and Perfex, $25; 12 in. W. & M. reversible propeller, $10; comet magneto, $6. All like new. Milton Stewart, Santa Barbara, Cal.

THE MOTOR BOATING MARKET PLACE

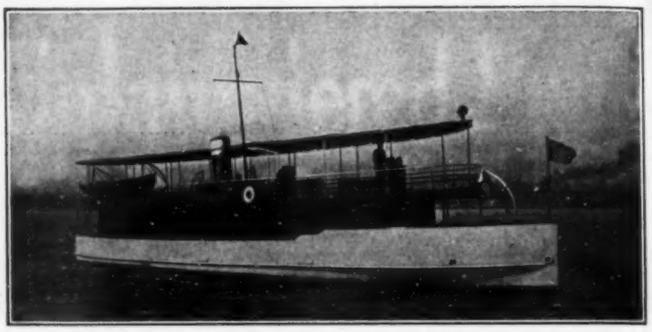
The rate for "For Sale" and "Want" advertisements is 3 cents per word. If an illustration is used the charge is as follows, which includes the making of the cut:
Cut one inch deep, one column wide..... $2
Cut 1½ inches deep, 1½ column wide..... $3
Cut three inches deep, three columns wide..... $10

Opportunities for the Motor Boatman

Before you buy or before you sell examine the exceptional buying and selling opportunities under this heading. They comprise the best offers of the month. Please mention MoToR BoatinG.



No. 6615.—Raised Deck Cruiser as comfortable as a houseboat but much more seaworthy; length 46 ft., beam 12 ft., draft 3 ft.; built 1912. Two 4 cycle motors. Inspectable at Atlantic City. For further particulars address, FRANK BOWNE JONES, Yacht Agent, 29 Broadway, New York.



FOR SALE, CHARTER.—Very reasonable; steel, twin screw, 80 x 14 x 3.6 ft.; two 60 H. P. Craig engines. Four staterooms, electric lights, etc. Deck houses solid mahogany. Gasoline capacity, 1,500 gallons; fresh water, 400 gallons. Yacht now in Florida waters. Can be purchased for less than one-third of original cost. Address, Owner, 1414 Fisher Building, Chicago.

BUY SELL EXCHANGE
Marine Glasses—Binoculars—Telescopes—Compasses—Barometers—Kodaks—Colored Eye Glasses—etc. E. B. Esaac, 26 John St., near Broadway, New York.

CANADIANS, Second-hand engine bargains. Send for list. Guarantee Motor Company, 73 Bay Street, North. Hamilton, Ont., Canada.

FOR SALE—27 ft. cruiser, brand new, latest style. Price $600 for quick sale. James Wilde, Pearl River, N. Y.

USE "SNAPPER" ENGINES for your small boat. They are a big little engine built by The Automatic Machine Co., Bridgeport, Conn.

I HAVE $4000 in cash to pay for a desirable gasoline cruiser. Must be a bargain. If so, send plans, specifications and photographs. X. Y. Z., care of Motor Boating.

WILL SWAP 5 H. P. Buffalo motor for launch hull or sail boat. What have you got to swap? Box 864, Mobile, Ala.

MODERN FLORIDA YACHT HOUSEBOAT FOR CHARTER.
Length 85 feet, beam 18 feet. Standard motors. What's the use of sending your yacht from Northern waters, when you can charter one of our houseboats on the spot, for about the price of bringing your boat here? We have been building houseboats for the last 12 years and offer you light draft, well ventilated cruisers that will go anywhere in Florida. "Florida Houseboats built in Florida." McCoy Bros., Daytona, Fla.

4 CYLINDER COILS, $12.00. 2-cylinder coils, $5.00, with demountable units. These are new goods, shop worn, and worth double the price. Kermath Mfg. Co., 45 East Fort St., Detroit, Mich.

CLEARING OUT SALE.
One 23-foot family Runabout, V bottom, 5½-foot beam, 15 H.P. 3-cylinder Erd. Reverse gear rear starter, auto control, cork pine planking. Decks combing chairs, seats. Lining, cherry stained mahogany. Speed 17 miles. Everything new. Also auto top. Price $400. Very safe and speedy boat. Dick Barrett Boat Mfg. Co., Muskegon, Mich.

Fast Day Cruiser, "Comet," 36 ft. x 7 ft. x 30 in., Torpedo model, 1¾ in. strip hull, full glass cabin, electric lighted, toilet, hair cushions, 4 gauge saluting cannon. New 4-cylinder 5 x 6 Buffalo engine. Reverse gear, aluminum base, double ignition, Bosch magneto, mechanical oiler, Harthan wheel. Sacrifice for quick sale, or sell engine separate. Albert F. Jacobs, 1023 N. Grand, St. Louis, Mo.

FOR SALE—One V Bottom Runabout, 23-foot long, 4 ft. beam. 60 H.P. Thomas 4-cylinder engine, reverse gear auto control, speed 24 miles per hour. Boat is one year old, all in good condition. Price $300. Dick Barrett Boat Mfg. Co., Muskegon, Mich.

40 x 13½ auxiliary sloop yacht, mahogany finish cabin, bright decks and cockpit, brass binnacle, carpet, cushions, curtains, toilet, stateroom, etc., complete. Sterling engine, perfect condition, speed eight miles. Will sell with or without engine. Sails and rigging good, new jib. Bargain. Address, Reasonable, Box B, Motor Boating.

WANT TO TRADE a high grade L. C. Smith shotgun for speed motor, six to twelve horsepower. Robert Voellinger, 1117 Belmont St., Vicksburg, Miss.

Motor Boating's Big Sales Co-operation

Buy from Your Nearest Dealer

FOR the convenience of readers, Motor Boating has made arrangements with leading dealers in the largest cities to handle all articles advertised in Motor Boating. This, of course, refers to all goods that lend themselves to dealer business. If they do not carry the goods in stock they will be in a position to give you the prices and other information and then get same on order. In short, Motor Boating will be their special catalogue. These dealers have been very carefully selected and have the absolute endorsement of Motor Boating.

This plan means that you can buy all these nationally advertised accessories from your own dealer. You can see, or know all about the goods before you pay your money.

The fact that an article is advertised in Motor Boating is a stamp of quality. The management of Motor Boating makes it a point to eliminate all inferior goods. This, of course, does not mean that all products not advertised in Motor Boating are unworthy of your attention. Call on, or write, the dealer nearest your home.

The following list of responsible dealers has been entered by Motor Boating. New Names will be added as soon as our representatives get in touch with other desirable dealers.

Atlanta, Ga.
Chas. E. Miller
Atlantic City, N. J.
Auto Marine Supply Co.
Baltimore, Md.
The James Walker Co.
Brooklyn, N. Y.
Chas. E. Miller
Boston, Mass.
Chas. E. Miller
A. S. Morss Co.
Buffalo, N. Y.
Chas. E. Miller
Chicago, Ill.
Geo. B. Carpenter & Co.
Christchurch, N. Z.
Leader Launch & Equipment Co.
Cincinnati, Ohio
The Herman Burmiller Co.
Cleveland, Ohio
Chas. E. Miller
The Motor Boat & Supply Co.
Detroit, Mich.
Chas. E. Miller
Nichoalds Co.
Hartford, Conn.
Chas. E. Miller
Minneapolis, Minn.
J. C. Shadegg Engine Co.
Newark, N. J.
Chas. E. Miller
New Orleans, La.
Chas. E. Miller
New York, N. Y.
Auto Supply Co.
C. D. Durkee & Co.
Chas. E. Miller
W. & J. Tiebout
Topping Bros.
Philadelphia, Pa.
Chas. E. Miller
F.Vanderherchen's Sons
Richmond, Va.
A. S. Kellam, Inc.
Rochester, N. Y.
The Hall Tuckitt Co.
Springfield, Mass.
Chas. E. Miller

119 West 40th Street — **MOTOR BOATING** — **New York City**

The Biography of Gasoline

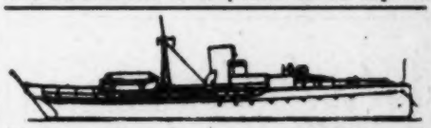
(*Continued from page 13*)

in diameter by forty feet high in which the naphtha is deodorized and cleansed of its impurities by means of sulphuric acid, caustic soda, litharge and other chemicals, forced through it by compressed air. While the rational of this treatment is not fully understood, it appears that the action of the various chemicals decomposes or separates the aromatic hydrocarbons, fatty and other acids, etc., which would lower the quality of the naphtha. The process, which requires about nine hours for purification of 1,800 barrels of the volatile liquid, is completed by a washing with water, to remove what traces of sulphuric acid and caustic soda remain in suspension, the water being sprayed in at the top of the agitator, to fall by its own weight to the bottom where it is let out.

As it is the policy of the refining companies to reduce waste to the minimum, the chemicals used in this agitating process are collected and after treatment, are used again, while the water which has been used to wash the naphtha, and that which is used for cleansing stills, agitators, tanks, etc., is collected in open tanks and allowed to settle, when the oil which it has carried off with it is redeemed.

After purification the naphtha is redistilled, this time in a steam still, and separated into three grades or cuts, known as "auto" gasoline, commercial naphtha, and benzine. The steam stills in which the necessary heat is obtained from live steam also differ from the other type in that the outlet pipes for the vapors are led to a considerable height before reaching the condensors, so that any liquid present in the vapors may fall back and be returned to the still. This process being the final one in the refinement of gasoline, greater care than before must be taken to vouchsafe the purity of the product. It is therefore necessary to provide two condensing coils, the first of which is fitted with a "back trap" through which the heavier oils present, condensing quickly, flow back to the still, while the lighter products, still in gaseous form, continue until the second condensor is reached. Here, they too become a liquid and are carried off to the receiving tanks after distribution through the inspection box. In order to secure the very lightest products of petroleum, known as cymogene and rhigolene, those vapors still uncondensed are liberated by means of the V-shaped gas trap referred to above, and instead of being returned to the furnaces are passed through a third condensor, in which by means of water and salt a temperature as low as 32° F. is maintained. Cymogene, which has a density of 108° Baumé, as compared to the gasoline we get nowadays which measures from 60° to 62°, is, with rhigolene, refined in insufficient quantities for commercial purposes. (As a matter of fact, it is likely that if it were burned in a gasoline engine it would not content itself with exhausting through the proper ports, but would take cylinder head and all with it after the first few very powerful explosions.)

The gasoline having at last been separated from its near relations, it is stored in tanks to await distribution. Some of it is pumped into tank cars and is shipped overland to distributing stations from which it is carted in wagons to supply retail dealers, or it is put into 50-gallon steel drums for barge transport to waterfront towns. For distribution by water to the immediate neighborhood of the refinery, it is loaded in bulk in the hold of a small tank steamer which makes regular trips to the clubs, gasoline wharfs, and to such big motor yachts as can handle 500 to 1,000 gallons in their tanks. To reach the little fellows it goes through one more handling, and it is at this last stage that we know it best. It is interesting to note that this last step (from supply station to motor boat) is the only one in which it is exposed to the open air from the time of leaving the well in the crude state.



Methods of Finding Displacement.

(*Continued from page* 10)

centerline. This line *AB* is divided into a convenient number of equal parts. Then the ares may be found by useing Simpson's first or second rule, by allowing the lengths of the ordinates to represent the areas of the stations.

Proof.

Taking the midship section as an example, we have:

ORDINATES	LENGTH	MULTIPLIERS	FUNCTIONS
1	0.00	1	0.00
2	0.73	3	2.19
3	1.22	3	3.66
4	1.64	2	3.28
5	2.02	3	6.06
6	1.27	3	3.78
7	0.00	1	0.00
		Total	18.97

(B) By Simpson's Second Rule:

18.97 x (⅓x.7) x 2 equals 17.52 sq. ft.

By planimeter the area of this section is 17.48 sq. ft. The difference is due perhaps to the inaccuracy in handling of the planmeter.

Another method which is not quite as accurate as in Figure 2, is shown in Figure 3. In this, the one side is assumed to be laid over the other, making the square 'ABA' B'. The area of this of course would be *AB X A'B*. The area of the figure *B'XBY* or the overlapping sides would approximately *BOXXY*. Then the area of the whole underwater section would be the sum of the two.

Proof:

The area of ABA' B' is 57″ x 37″ equals 2109 sq. in.

The area of B' XBY is 33″ x 11″ equals 363 sq. in. Total equals 2472 sq. in, or 17.16 sq ft.

By planimeter this section measured 17.48 sq. ft. which shows this method to be nearly accurate.

A method that is very simple and yet gives fair results is shown in Fifure 4. Here the section is divided into foot squares, triangles and rectangles as shown. Then by adding the areas together and multiplying by two the area of the whole section is found.

Proof:

Adding the whole areas together we have 1242 sq. in. This multoplied by two equals 2484 sq. in. or 17.25 sq. ft.

By planimeter this section reads 17.48 sq. ft.

In the absence of a planimeter, Rules 3 and 4 can be substituted and relied upon by amateurs. As can be seen the difference between the planimeter readings and these mehods, give a margin in the amateur designer's favor.

The Panama-Pacific Race.

(*Continued from page* 16)

5/21sts, and so on. The value of the trophies will be similarly apportioned as to the first three places, after which they will be of equal value for all finishers.

The race is open to boats propelled by internal combustion motors (using either gasoline, kerosene, or crude oil as fuel), as coming under the definition of cruisers as defined by the American Power Boat Association.

No competing boat shall be less than 55 L. W. L., or more than 100 feet L. W. L. (The equipment required is enumerated later.) Engines must be below deck or thoroughly housed in. The Committee reserves the right to pass on any entry as to equipment, seaworthiness, and general ability of the boat and crew to perform a long passage in open water.

Rating will be calculated and time allowance figured under the 1915 rules of the American Power Boat Association with horsepower calculated according to the following formula:

Area of piston (sq. in.) x number of cylinders x stroke (decimals of a foot) x r.p.m., divided by a constant. The constant for four-cycle engines using gasoline shall be 1000. For two-cycle engines using gasoline, it shall be 750. The constant for Diesel engines is to be determined by investigation as soon as possible. The boats will start according to the handicaps figured as above, and the 1915 American Power Boat Association racing rules will apply where not otherwise stated by the Committee.

The Committee assume that the entrants have a thorough knowledge of the amount of fuel needed to make the various legs of the race, and therefore do not specify any particular quantity.

Each boat may be equipped with suitable spars and rigging to carry sufficient sail to give her steerage way in a moderate breeze. This sail can be spread in any shape, but must not exceed in square feet or area the square of the load water line divided by 7.5 as a constant.

Stores and water sufficient for thirty days for each man must be carried on leaving each port excepting Colon.

(*Continued on page* 54)

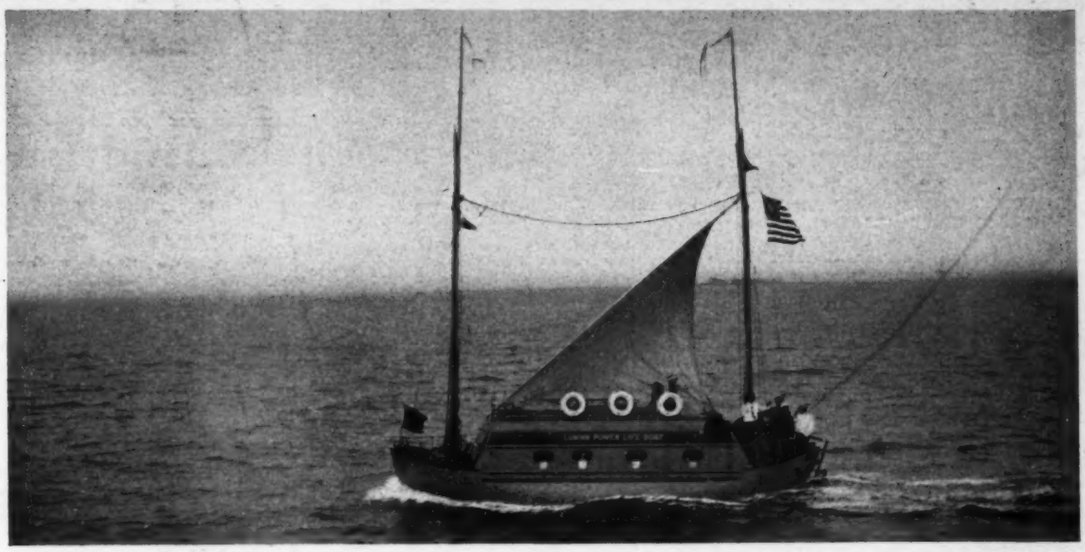


Photo by E. Levick, N. Y.

"We have used Valspar exclusively," says the Welin Company———

VALENTINE'S
VALSPAR
The Varnish That Won't Turn White

Seldom, if ever, has a varnish been called upon to stand such a test as is demanded of Valspar by the Lundin Power Life Boat, built to cross the Atlantic.

In choosing a varnish for the tall wireless masts and the gunwales of this boat, the Welin Company wanted a varnish that, in spite of constant exposure to salt air, rain and sea water, would still retain its brilliance and give the materials perfect protection. To use their own words—"We have used Valspar as we want the woodwork to look as nice as possible when she arrives on the other side after an expected hard trip, and believe that Valspar will do the trick better than any other."

That is the opinion of all nautical experts, and is the reason why Valspar is used on such boats as the Cup Defender "Vanitie", Sir Thomas Lipton's Challenger, "Shamrock IV", and on Rodman Wanamaker's Transatlantic flying boat "America".

Name of nearest dealer on request. A 4-ounce can will be sent on receipt of 10 cents in stamps to cover mailing and package. Write for our practical book on boat finishing.

VALENTINE & COMPANY
456 FOURTH AVENUE — NEW YORK CITY
Largest Manufacturers of High-grade Varnishes in the World

NEW YORK
CHICAGO
BOSTON

ESTABLISHED 1832
VALENTINES VARNISHES

TORONTO
PARIS
AMSTERDAM

Wherever a varnish is wanted that is permanent and imperishable and one that will give the fullest measure of protection, there Valspar is used. For Valspar is the *only waterproof varnish in the world*—the one varnish that water does not turn white. Valspar is an extra durable, quick-drying varnish.

To be sure of getting a really good bottom paint, specify Valspar Bronze Bottom Paint. It is durable, handsome, anti-fouling and easy to put on.

WELIN MARINE EQUIPMENT CO.
LONG ISLAND CITY

July 23, 1914.

Mr. HASKELL, Mgr. Specialties Dep't.,
VALENTINE & COMPANY,
456 Fourth Avenue,
New York City.

Dear Sir:

Referring to the 36-ft. Lundin Power Life Boat which is going to start on her journey across the Atlantic on Tuesday, July 28th, we are pleased to advise you that we have used Valspar exclusively on her tall wireless masts and also on her gunwales. We have done this as we want the woodwork to look as nice as possible when she arrives on the other side after an expected hard trip and believe that Valspar will do the trick better than any other.

Yours very truly,
WELIN MARINE EQUIPMENT CO.
Geo. H. Schroeder,
Secy. and Treas.

GHS/RF

Built from MoToR BoatinG's Plans.

(*Continued from page 15*)

and the cabin floored. When the cabin was finished except for the joiner work, the cockpit was ceiled and floored, the bridge finished and canvassed, and the rear seats put in. Then, after calking and puttying the hull, we painted her white, with green anti-fouling paint on the bottom and light tan on the deck.

After looking through the pages of MoToR BoatinG (which I have taken for four years) we decided on the Kermath 12 h.p. 4-cyl., 4-cycle engine as the one best suited for this boat. It has come up to our expectations. On the day after she was launched Wanderer began her trip from Newark, N. J. (twenty-five miles by water from New York) to Osterville, Mass., on Cape Cod, a total of some two hundred and fifty miles; after which she was run all summer, taking out as many as twenty people each morning. The engine ran like a sewing machine all the time.

With the engine in place she was soon piped up and the shaft put in with an Ailsa-Craig 16x2" Columbian wheel. The exhaust outlet on the muffler is about a foot below the waterline with an above-water exhaust, and the water does sometimes get into the muffler, but the engine always kicks it out, and we never have had any trouble at all along this line.

Next we put in the bunks, lockers, etc., keeping as close as possible to the plans.

Last but not least came the fittings, and we didn't skimp on them by any means. Everything was of polished brass except the ventilator, which we painted the same color as the deck. We got a fine "Reliance Rochester" steering wheel with the drum below deck.

About 8 o'clock, Saturday, July 18, 1914, a house mover came, and after a cradle was made for her, she was loaded on a truck and carted triumphantly off to the Passaic River some five miles away. My brother and I rode along in the boat and got everything in readiness for the launching. About 4 o'clock (we didn't get away from the house until after noon), we reached the marine railway at Kroll's dock and loaded her on, and about half past five she hit the water. Fifteen minutes later we got the engine going, and as I threw in the clutch, I felt—oh well, you fellows who have built your own boats know how I felt. I advanced the spark, the engine speeded up, and we were soon pushing along at a fair ten-mile speed, the engine sounding like a steady purr to us who had before been used to a single-cylinder put-put. When we got back to the dock, we were about the happiest kids on earth. Some of the "old salts" at Newark advised us to try the engine for about a week, but next day at 10 o'clock three of us started off for Cape Cod, where we arrived four days later. At night we anchored in harbors and slept aboard the boat, getting one big meal ashore each day and cooking the rest on the "Primus." On our third day out we had to put in at Watch Hill about 1 o'clock on account of a threatening thunderstorm.

Below is the log of the Wanderer from Newark to Osterville. It may be of some interest to the salts who own and run their own boats.

SUNDAY, JULY 18.

9:55—Left Kroll's dock, Newark, N. J.
12:33—The Battery, New York.
12:43—Brooklyn Bridge.
12:45—Manhattan Bridge.
12:49—Brooklyn Navy Yard.
1:05—Williamsburg Bridge.
1:21—Blackwell's Island Bridge.
1:29—Laurence Point.
2:10—Clauson's Point.
2:35—Throg's Neck.
2:56—Execution Rocks.
3:25—Wanderer AFIRE!
5:46—Shippan Point, Stamford, Conn.
6:15—Tied up at Stamford.
Estimated distance—65 miles.

MONDAY, JULY 20.

8:00—Left Stamford.
9:02—Green's Ledge Light.
9:35—Peck's Ledge Light.
9:55—No. 20 Bell.
10:53—Penfield Light.
12:30—Abreast New Haven.
1:20—Branford Beacon.
2:00—Abreast Faulkner's Island.
3:00—Hammonassett Point.
4:00—Cornfield Point.
5:15—Tied up at Saybrook, Conn.
Estimated distance—62 miles.

TUESDAY, JULY 21.

9:45—Left Saybrook.
11:06—Black Point.
11:30—Bartlett's Reef Lightship.
11:45—Abreast New London.
12:06—Sea Flower Beacon.
12:23—Ram Island Lightship.
12:40—Latimer's Reef.
1:30—Tied up at Watch Hill, R. I.
P.M.—Thunderstorm.
Estimated distance—30 miles.

WEDNESDAY, JULY 22.

5:45—Left Watch Hill.
6:35—Watch Hill Light.
8:04—Steering gear broke; 35 minutes delay.
10:07—Point Judith.
12:31—Sakonnet Point.
3:00—Quick's Hole.
3:46—Abreast Tarpaulin Cove.
6:45—Osterville, Mass.
Estimated distance—93 miles.
Total Estimated Distance—250 miles.
Average speed about 8 miles an hour.

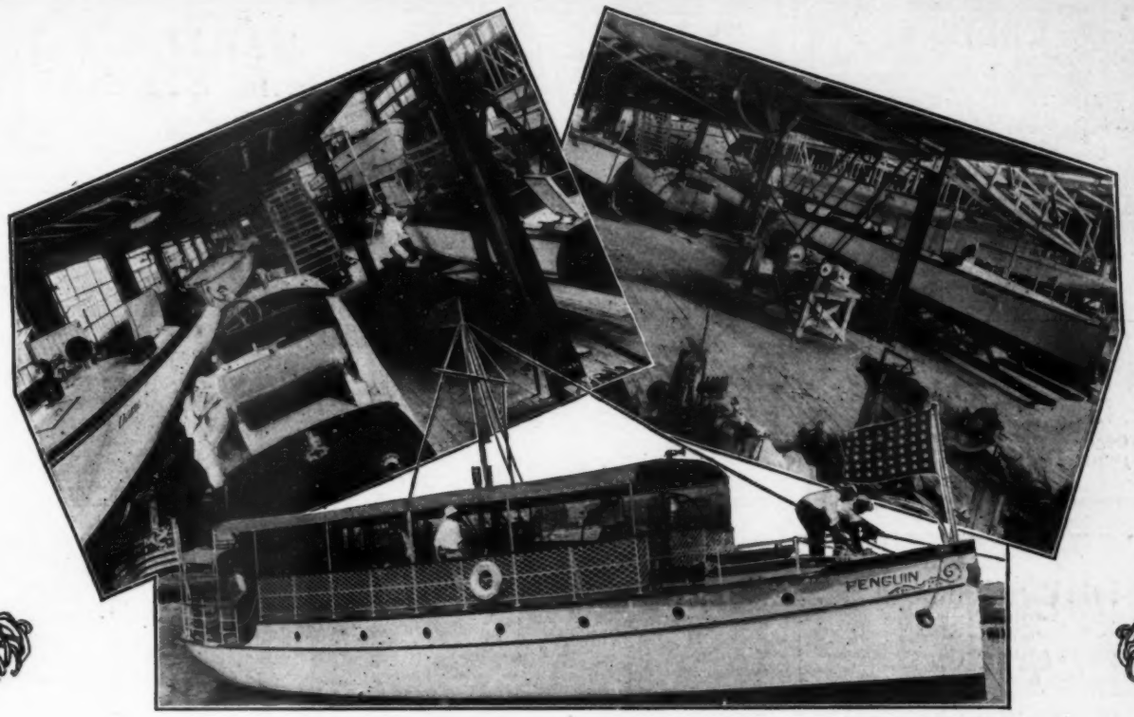
It will be seen in the above that the boat caught fire a little past Execution Rocks. It was Sunday morning when we started out and we were un-

(*Continued on page 54*)

Motor Boating's Market Place columns offer the buyer and seller of used motor boats, fittings, etc., a quick and convenient medium of exchange.

If you are getting a new boat or a new engine, and wish to sell the old one, don't have it rotting, or rusting or collecting storage charges—sell it—in the Market Place.

Three cents per word.



X-CELO—

Cruisers That Are "Different"

The man who seeks the fresh, original, unhackneyed cruiser design chooses an X-Celo inevitably. An X-Celo Cruiser is not like other cruisers. It represents your desire amplified by our resourcefulness. It carries finally that air of distinction that men of judgment prize.

The cost of an X-Celo Cruiser is not excessive. Many men after being aboard an X-Celo and making a careful inspection have been surprised at the reasonableness of the price.

X-Celo Cruisers Built in a Really Modern Yard

If X-Celo Cruisers came out of the average boat yards, their price might easily become prohibitive. Only by the most modern practice in manufacturing methods can such cruisers be produced at a really moderate price.

You'll be astonished at the care that goes into the production of each minute detail of finish. That same caution and watchfulness has determined the placing of each bronze rivet—the choice of every piece of white oak, mahogany, yellow pine.

An X-Celo Cruiser is as good as it looks, through and through, from stem to stern post. A big contributing factor to this goodness is large number of patented and exclusive features. You can't find them on other boats.

Tell Us Your Ideal in Cruisers—We'll Show You Why an X-Celo Meets Your Requirements

Write us telling us what sort of cruiser you are planning—what you expect it to do. Ask your naval architect to communicate with us. We build our cruisers from the designs of naval architects in all parts of the country and our success has been due to the precision with which we follow their instructions. Your naval architect is undoubtedly already familiar with our work and our excellent facilities for following his instructions and specifications.

Some rather unusual improvements have been recently made in our famous X-Celo Runabouts—a full description upon request.

For Valuable Cruiser Information Get the X-Celo Literature

Write for it today—and don't forget to tell us what you think about cruisers. We want to know.

Milwaukee Yacht & Boat Co., 101 Becher St., Milwaukee, Wis.

Designers and Builders of X-Celo Runabouts and X-Celo Cruisers

Statement of the Ownership, Management, Circulation, etc., of Motor Boating, published monthly at New York, N. Y., required by the Act of August 24, 1912. Editor, J. C. Chase, 119 W. 40th St., New York City; Managing Editor, C. F. Chapman, 119 W. 40th St., New York City; Business Manager, George von Utassy, 119 W. 40th St., New York City; Publisher, International Magazine Company, 119 W. 40th St., New York City. Owners: International Magazine Company, 119 W. 40th St., New York City; Stockholder, M. V. Hearst, 137 Riverside Drive, New York City. Known bondholders, mortgagees, and other security holders, holding 1 per cent. or more of total amount of bonds, mortgages or other securities: Columbia Trust Company, 60 Broadway, New York City; M. V. Hearst, 137 Riverside Drive, New York City; Arthur Brisbane, 238 William St., New York City; Lina Straus, 27 W. 72nd St., New York City; George J. Gould, 165 Broadway, New York City; E. H. Gary, 856 Fifth Ave., New York City; Samuel Untermyer, 37 Wall St., New York City; Geo. W Perkins 71 Broadway, New York City; James Speyer, 1058 Fifth Ave., New York City; H. O. Shepard Co., Chicago, Ill.; Good Housekeeping Co., Springfield, Mass. (Signed) George von Utassy, Bus. Mgr. Sworn to and subscribed before me this 23rd day of September, 1914. (Signed) Emilie Quick, Notary Public, New York County, No. 3133, Register No. 6005. [Seal] (My commission expires March 31, 1916.)

Built from MoToR BoatinG's Plans.

(*Continued from page 50*)

able to get a priming can, so we bought a little glass flask and put our priming in that. This flask we carelessly laid on a shelf just above the engine. When we got up in the Sound we got to rolling and a wave came along and gently tipped the flask off the shelf onto the magneto. The result was quite interesting. To me in the cockpit it looked as if the boat was gone, for the flames came up clear through the hatch; but my brother, who happened to be in the cabin, yanked the "Pyrene" down and had everything out in such short order that not even a blister can be seen there now. Thank goodness we squandered eight good iron dollars on that Pyrene. Sand would never have put that fire out.

Wanderer cost roughly about $700, the engine and the attendant fittings comprising about half the expense. The lumber bill was unusually large, as the mistakes we made were many and disastrous to the lumber. But for a twenty-five foot cruiser built by two greenhorns, we think that isn't so bad!

The Panama-Pacific Race.

(*Continued from page 48*)

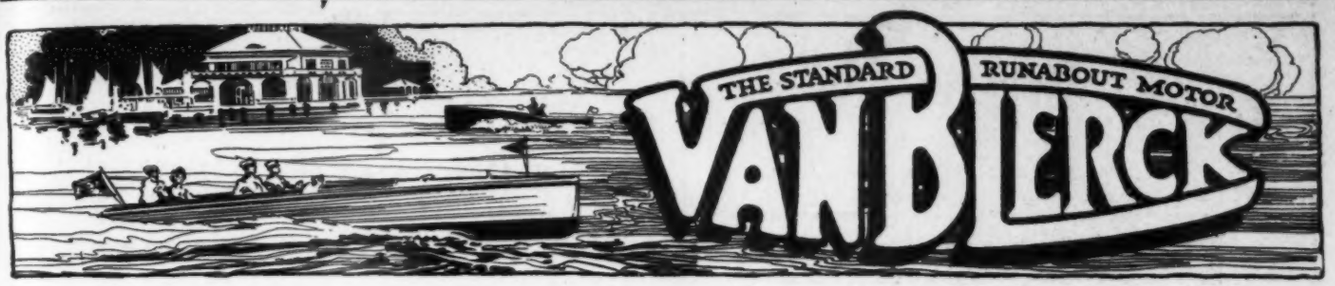
No boat will be allowed to start from any of the ports of call with fewer than eight men aboard, one of whom shall be a practical navigator and one of whom shall be a practical engineer.

Each competing boat shall carry *at least* one small boat, and *at least* one life raft (as many more of each as may be desired) of sufficient combined buoyancy to save the whole crew. Each small boat carried shall be equipped with fresh water casks and provender as prescribed by the United States Bureau of Steamboat Inspection. United States Government requirements as to life preservers, and other appliances must be observed. Also each boat must carry at least two ring buoys conveniently located on deck. At least one fire extinguisher of approved type to be carried in each compartment, and at least one on deck. Full set of navigating instruments, spare compass, sea anchor, oil bags, chain cable, and suitable anchors, and at least one gallon of crude petroleum or other oil suitable for oil bags. Emergency tiller and suitable arrangements for fitting same. Assortment of spare engine parts and gear to the satisfaction of the Committee must be carried. Boats must be ruggedly built, to the satisfaction of the Committee, and must have permanent rails, properly bolted to the decks. Electric lights only will be permitted in the engine-room, or in compartments where fuel is stored. The Committee recommends but does not require the installation of wireless telegraphy apparatus. Medicine chests as prescribed by the Committee must be carried. The intent of the above is to insure contestants being properly equipped. The Committee reserves the right to order the addition to or replacement of any gear considered by it as insufficient or defective.

Fuel for engine must be carried in at least two distinct tanks. Fuel for lighting or cooking purposes must be carried in separate receptacles. Fresh water must be carried in at least two separate tanks. All tanks to be permanently piped, and securely fitted and fastened to the hull of the vessel to the satisfaction of the Committee.

Entries will be received until within five days of the start of the limit boat which starts on October 1st, 1915. Contestants must report for measurement at least three days before the start of the limit boat at a place near New York City to be designated. A fee of $10 will be charged for measuring. A final inspection will be made one hour before the start of each boat, when hull marks must not be above the load water line. Note: Extract from A. P. B. A. rule V, "The Measurer shall at the time of measuring, mark the forward and after ends of the load water line, and also the water line on each side of the boat at the point where the midship section is taken; such marks shall be made in a plain and permanent manner by a race knife." Boats will be measured with crew and full equipment on board. A forfeit of $100 cash, in the form of a certified check payable to the Chairman of the Committee, must accompany each entry. This check, or its equivalent in cash, will be returned to the owner or his representative by reporting official on arrival of the boat at Charleston, S. C. Protests as to the rating of a competitor must be filed in writing with the Committee at least two hours before the start of the protested boat, and must be accompanied by the deposit of $10 measuring fee if the protest is sustained, the fee will be returned to the protestor, if not, the fee will be forfeited. Protests as to the conduct of the race must be filed in writing with the Western Committee within twenty-four hours of the finish of the race. In either case, the protest must be signed by the owner or his representative. Measurements will be checked on arrival at San Francisco, due allowance being made for consumption of supplies and fuel.

At each port mentioned on the itinerary, a Reporting Station will be designated. A Reporting Official or Deputies will be on duty day and night for the execution of time slips, until all the contestants have reported. Slips will be signed by the Official in triplicate, one copy going to the Western Committee, and one to the Eastern Committee, and one retained by the contestant. The total of 120 hours compulsory stops is to be divided as follows: 48 hours, less the actual time for the canal passage, to be spent at Balboa. The remaining 72 hours to be divided among the seven other ports at the contestant's discretion, but all of this time must be used up before the boat leaves San Pedro. No allowance will be made above 120 hours. This time will be figured between the time the slip is actually handed to each official, and the time the official actually hands it back to the contestant, and *not* between the time the contestant drops anchor in a port, and gets under way.



100% Better — 10% Cheaper

ONE TYPE—BIG VOLUME

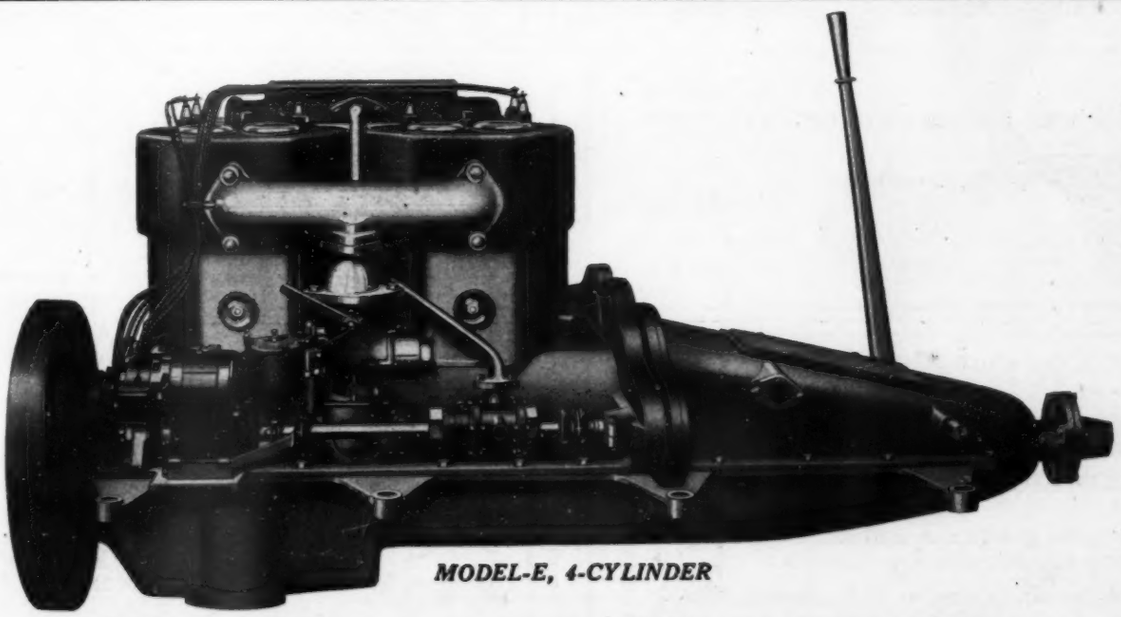
The 1915 Van Blerck models, specialized for runabouts and express cruisers, are built on a efficiency basis never before attained by marine engine manufacturer. 1914 saw our business increased by 100%, while contracts already in hand have warranted a manufacturing schedule three times that of the season just passed. Because of this unprecedented volume on one type of motor, we have made a radical (material) reduction in 1915 prices.

The new Van Blerck plant is undoubtedly a model for the production of high grade marine engines. Our special tool and jig equipment is the most complete and perfect ever designed and represents an investment which would be unwarranteed without big volume on a single type of motor.

The 1915 Van Blerck models— 100% better and 10% cheaper—represent the greatest value ever offered in high powered marine engines.

MODEL E.				MODEL E—SPECIAL.							
No. of Cylinders.	Rated H. P.	Rated R. P. M.	Net Prices.	No. of Cylinders.	Rated H. P.	Rated R. P. M.	Net Prices.	No. of Cylinders.	Rated H. P.	Rated R. P. M.	Net Prices.
4	65	1200	$1025	4	90	1600	Furnished on application.	2	20	650	$ 600
6	100	1200	1500	6	135	1600		4	40	650	975
8	135	1200	1950	8	180	1600		6	60	650	1375

The cylinder dimensions of all models are 5½ x 6 inches.



MODEL-E, 4-CYLINDER

VAN BLERCK MOTOR CO.

MONROE, MICHIGAN

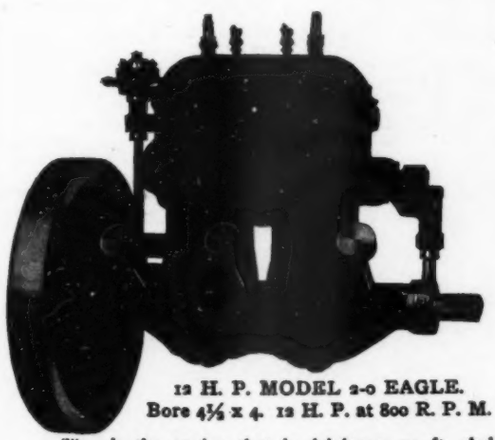
Build Your Business for All Time

Let Us Reason Together

QUALITY—SERVICE—PRICE

are the three important factors which have created our Marine Engine Business

When you recommend and sell a customer a Marine Engine and it exceeds all expectations, you have succeeded in attaching to your business a permanent customer—one that will talk and drive additional business your way.



12 H. P. MODEL 2-0 EAGLE.
Bore 4½ x 4. 12 H. P. at 800 R. P. M.

This is the engine that is driving a 14 ft. sled hydroplane at 24½ miles per hour, turning a 3 blade 14 x 25 pitch Atlantic propeller at 1285 R. P. M. This same engine will turn a 3 blade 18 in. x 22 pitch Hyde propeller at 830 R. P. M. It's the most powerful two cycle engine ever designed for its stroke and bore and weighs only 250 pounds. Price $160.00.

A reason why "EAGLE" distributors are the best engine agents in this and foreign countries is due to the permanent business they have created by pushing and handling consistently, quality engines only.

You will find these successful distributors and agents selling "EAGLE" Engines from year to year, due to the excellence of the product and the exceptional service we render to them through our big line and properly financed organization.

"EAGLE" Engines are the money-earning kind, they are the kind that put life into your business, the kind that make your business, the kind that make far more easy sales, the kind Mr. Live Dealer that you should investigate and promote.

"EAGLE" Engines are the last word in two cycle Engine construction. They have the following advantages over all other makes of the same rated horse power: **less weight, more power, more compact, superior construction** and **most important, they cost no more than those that do not have these advantages.** Complete line of **High Speed, Medium Speed** and **Extra Heavy Duty Marine Engines.**

18 separate and distinct models. The largest line of two cycle engines ever offered by a single manufacturer. Handsome illustrated catalogue sent free upon request.

The Standard Co.

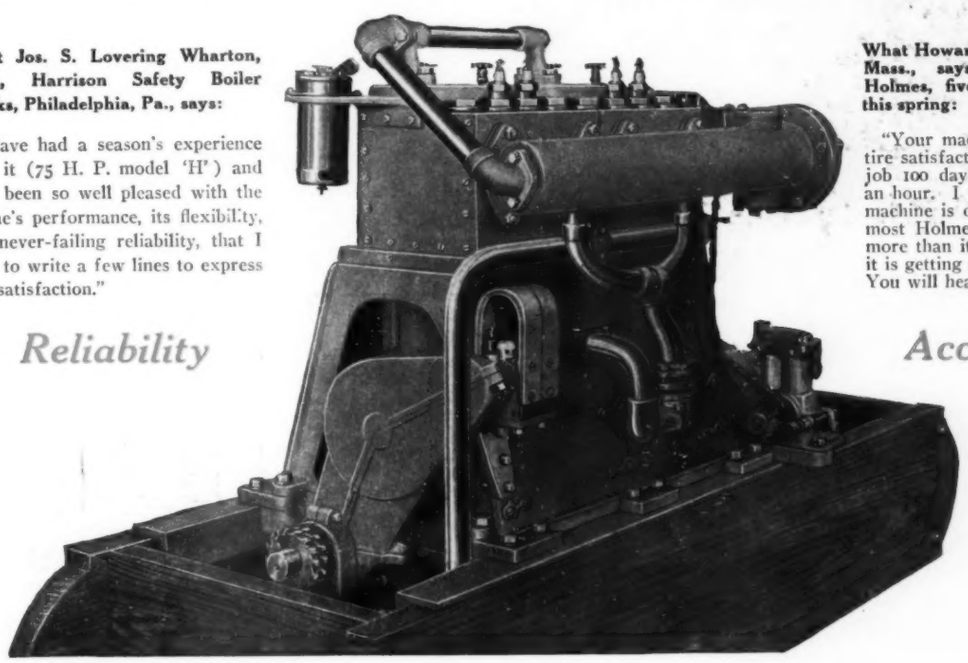
Torrington, Conn., U. S. A.

The Motor the Life Savers Use is the HOLMES

What Jos. S. Lovering Wharton, Pres., Harrison Safety Boiler Works, Philadelphia, Pa., says:

"Have had a season's experience with it (75 H. P. model 'H') and have been so well pleased with the engine's performance, its flexibility, and never-failing reliability, that I wish to write a few lines to express this satisfaction."

Reliability



What Howard M. Tilton, Haverhill, Mass., says of a second-hand Holmes, five years old, sold him this spring:

"Your machine has given me entire satisfaction. Have been on the job 100 days and have yet to lose an hour. I venture to say that this machine is doing harder work than most Holmes motors, and certainly more than it was designed for, and it is getting a good ad on this river. You will hear from me later on."

Accessibility

25 H. P. four cylinder model "J" Silent chain drive

Showing the intake pipe to the carburetor, which scavenges the smoke and gas from the base when motor is running. If the motor *should* back-fire, it must do so into the base, where it can do no harm.

THE HOLMES MOTOR COMPANY, Inc.

50 State Street
BOSTON, MASS.

Plant at West Mystic, Conn.

What Morris M. Whitaker says about
Loew-Victor Model 30

"Whizzer" making 19½ miles, equipped with Loew-Victor Model 30, owned by Morris M. Whitaker, Naval Architect, Nyack, N. Y.

September 17, 1914.

Loew-Victor Engine Co.,
Chicago, Ill.

Gentlemen:

It may be of interest to you to learn of the results I have so far obtained with my twenty-one foot "Air Cushioned" runabout, which is the boat in which I am using your Model 30 motor.

By doing a little experimenting with propellers, I have raised the speed from 18.12 to 21.04 miles per hour, and believe I can do still better by changing the trim slightly. In all my trials, I have carried a live load of 320 pounds, which is quite an item in a boat whose total running weight is only 1880 pounds.

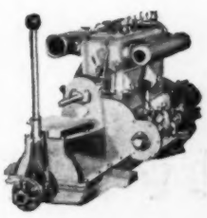
I want to compliment you on the running qualities and power of that little motor. If it were not for its substantial excess of power over its rated capacity, this rather remarkable speed would have been impossible. As it is, I am getting, I believe, considerably more speed than has so far been obtained for equal weight and power from any boat not a hydro. With the present wheel I am turning nearly 1400 and have maintained these revolutions constant for considerable periods.

The motor handles beautifully and is remarkably free from vibration at any speed. It is a pleasure to hear her hum and you have a good excuse for feeling chesty over its performance.

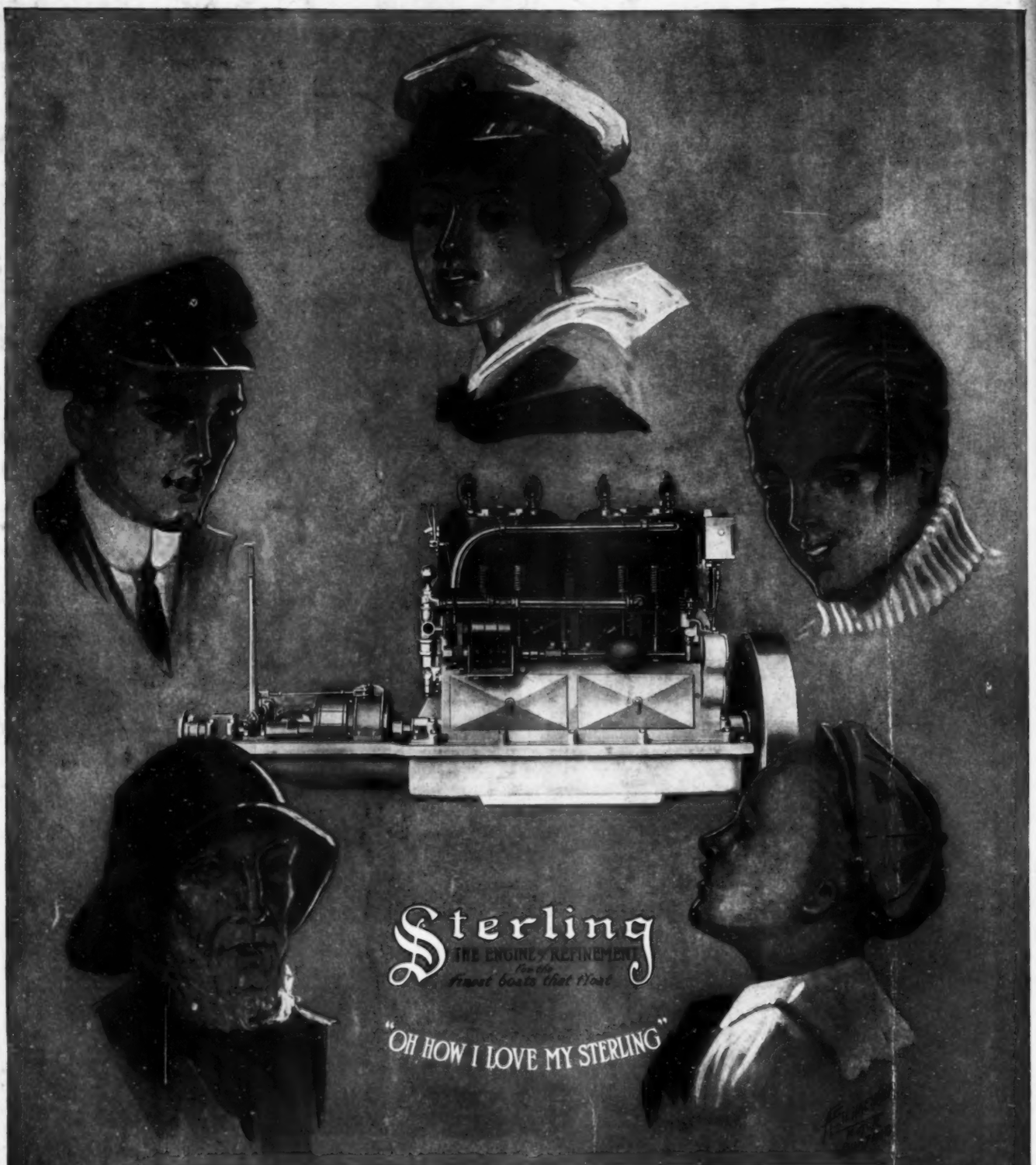
I enclose a photo taken when "Whizzer" was making about 19½ miles.

Very truly yours,
MORRIS M. WHITAKER.

LOEW-VICTOR ENGINES



North Oakley & Oakdale Avenues **Chicago, U. S. A.**



The Choice of Every Experienced Boatman

Yachtsmen, racers, old "salts,"—amateurs and experts alike—all give preference to the Sterling Engine when it comes to selecting a power plant for utmost reliability and service value. It is because the same superior qualities are maintained in every Sterling Engine that leaves the factory, whatever the size or type.

We cannot ask more than that you fully investigate the Sterling. You cannot, in justice to yourself, do less than investigate the Sterling, before you buy any engine.

WRITE TO-DAY FOR CATALOGUE

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